ECHNOLOGY DEPT!

Gas Journal

VOL. 274. 105TH YEAR. LONDON, JUNE 17, 1953. NO. 4698. PRICE 1/3

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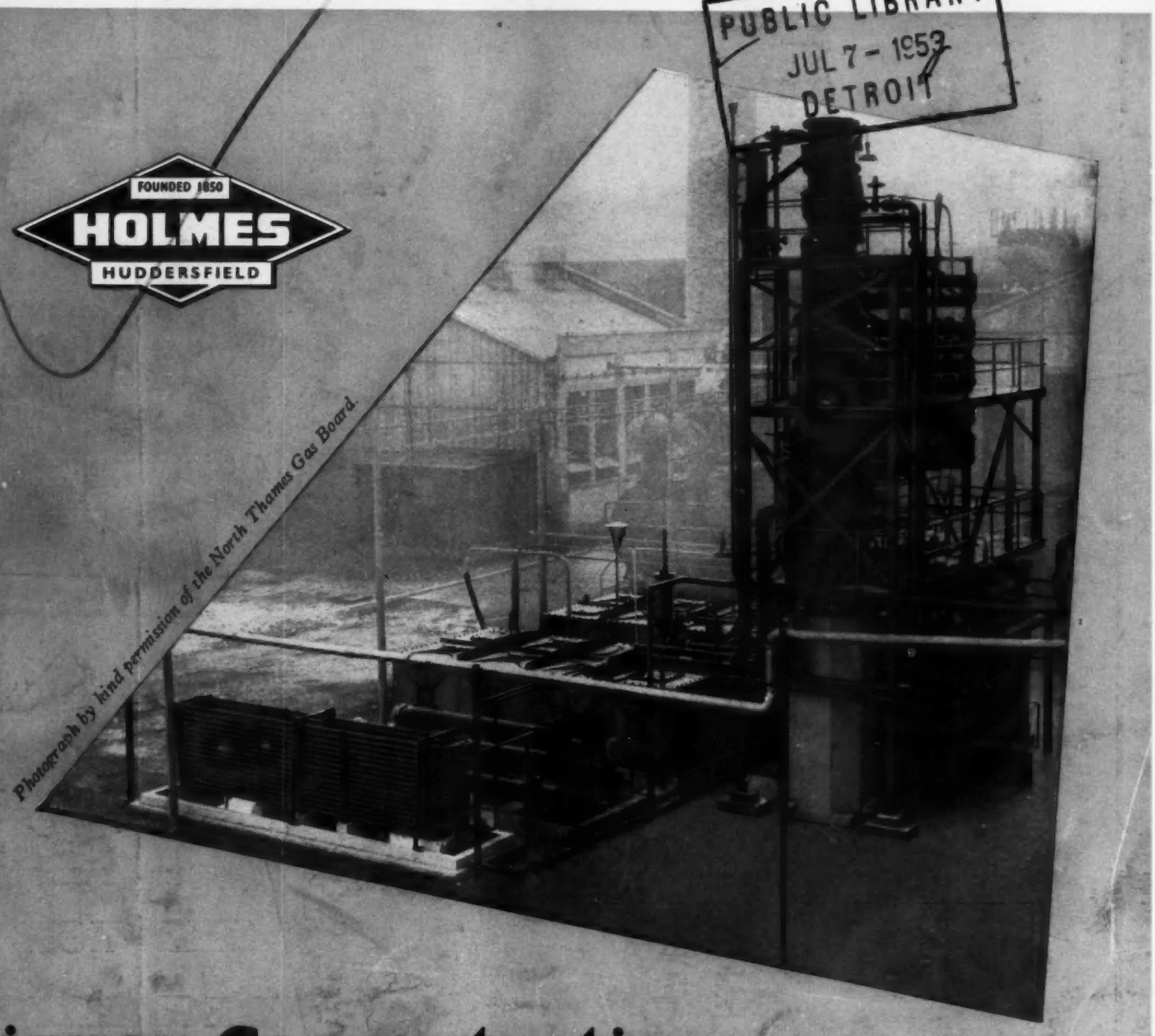

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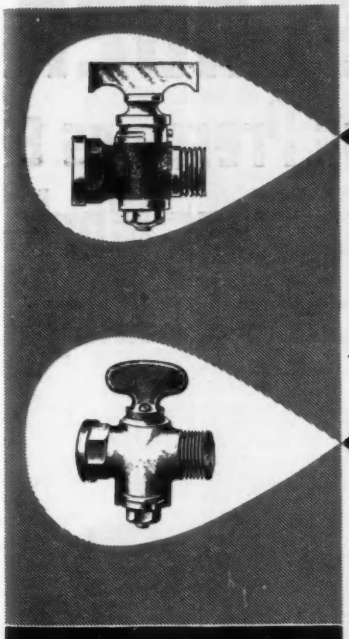
A STORY OF DEVELOPMENT

THE EVOLUTION OF THE Spersom MAIN COCK

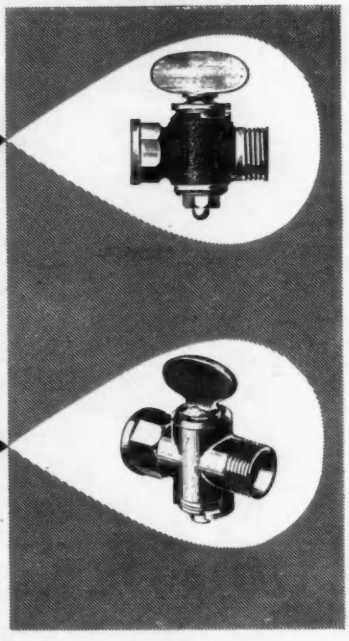


1901

At the Coronation of King Edward VII the "Spersom" Main Cock was 24 years old.

1911

Now ten years older the design is practically the same except for the contour of the Thumb Plug Fan.



1937

Great advancement has been made and the "Spersom" Main Cock has now self-lubrication and self-adjustment for wear.

1953

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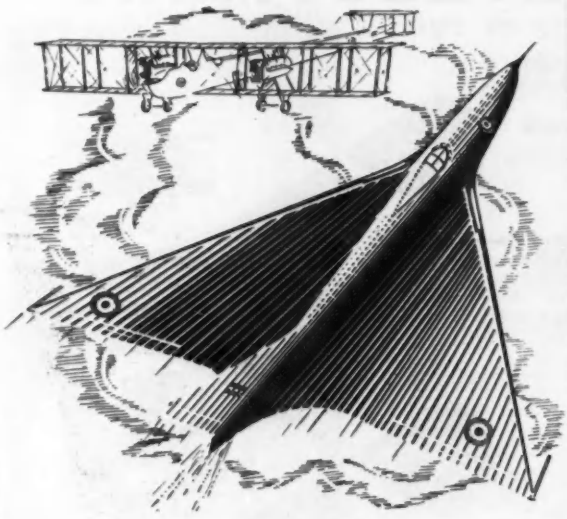

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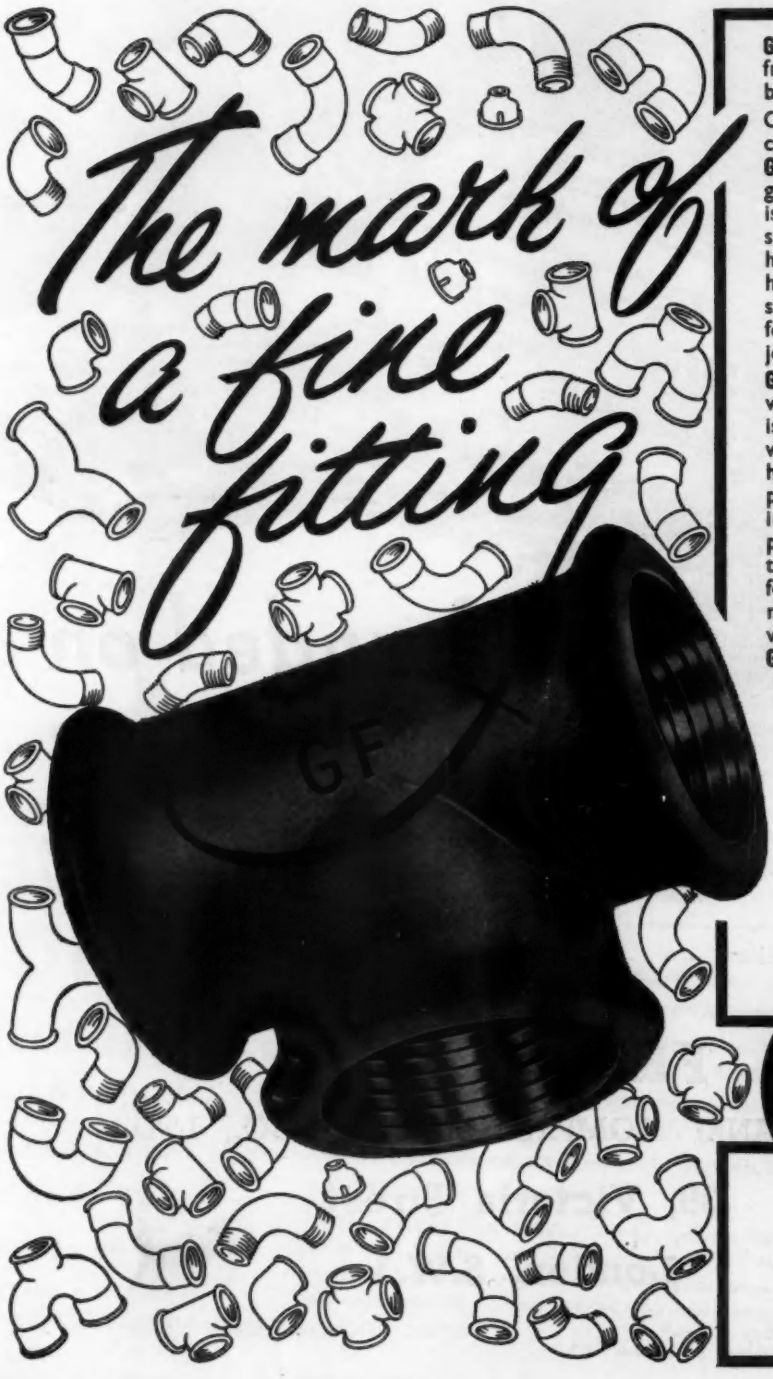

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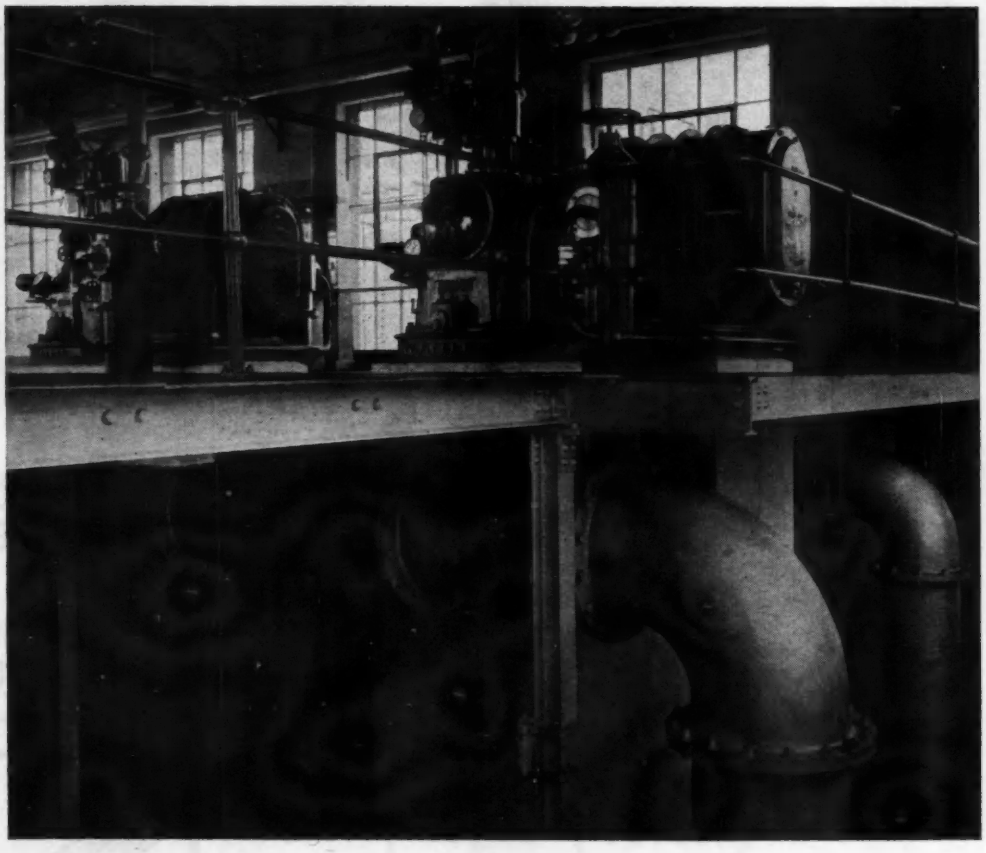

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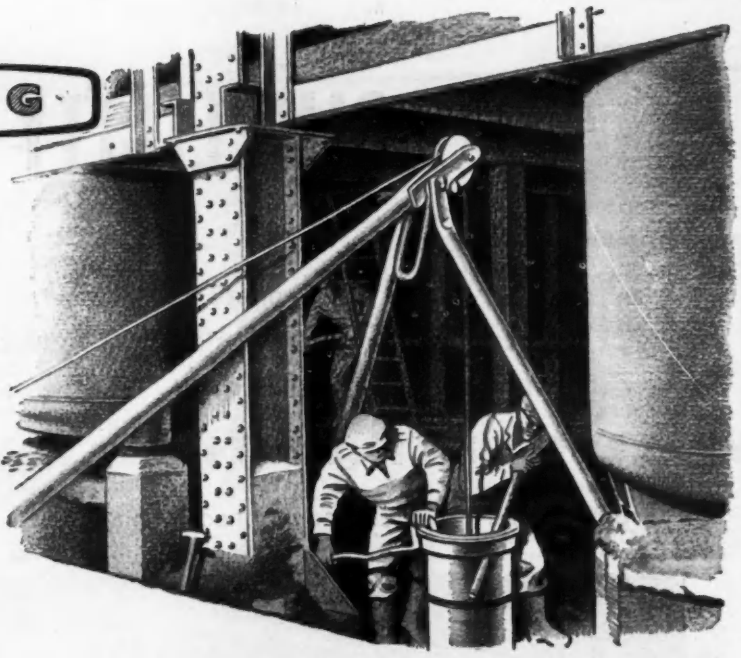

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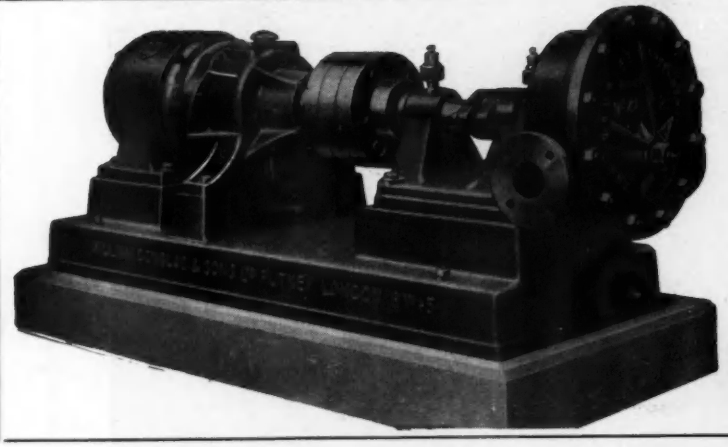

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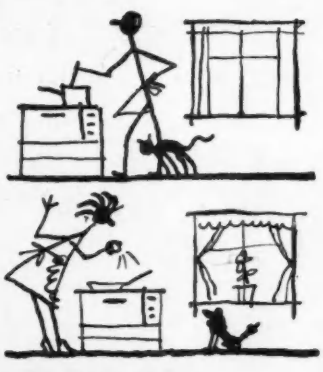

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Since an ancient Briton first attached a hide thong to his club — leather has played an important part in the equipment of the fighting man—indeed at one time leather jerkins constituted the armour of the 'Men-at-arms'. But to-day its uses are either: Ceremonial—such as the boots and gauntlets of a lifeguard — or functional — the boots of an infantry man. One thing, however, unites past and present and that is the care with which the skins are chosen, treated and made up. It is just this same care that has given 'Multitest' Gas Meter diaphragms their reputation for unsurpassed quality.

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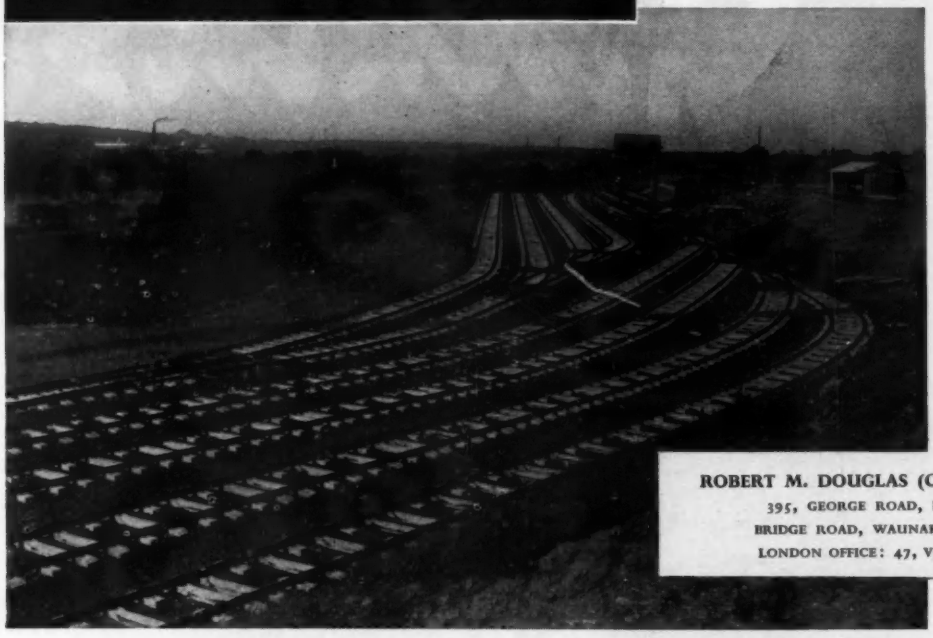

Photograph of the impressive Pollington sidings and screening plant constructed by DOUGLAS for the Directorate of Open Cast Coal Production of the Ministry of Works.

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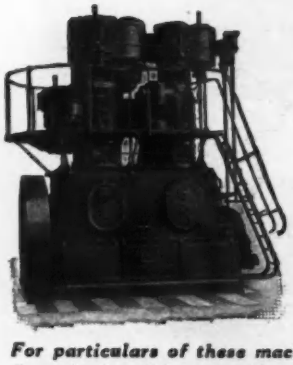

These double-acting cross-head type Compressors are provided with forced lubrication. They may be driven by any suitable power unit, as shown below, or by steam cylinders in tandem with the compressor cylinders making a self-contained unit, as shown on the left.

Single Stage. Pressures up to 40 lbs. per sq. in.
Capacities up to 10,000 cu. ft. per min.

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ONE MAN AND HIS STACKER...

he loads with it

1

Tows it

2

Unloads with it

3

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The C. & T. Light Mobile Stacker is available in four sizes with maximum delivery heights between 10 ft. 8 in. and 18 ft. At minimum elevation the exceptionally low overall height allows easy access to all parts for maintenance. Drive is electric, diesel or petrol.

Stacking coal in a cellar within 2 ft. of the ceiling . . . a faster, less costly method than barrowing and shovelling as done previously. (Photograph by courtesy of Jowett Cars Ltd., Bradford)

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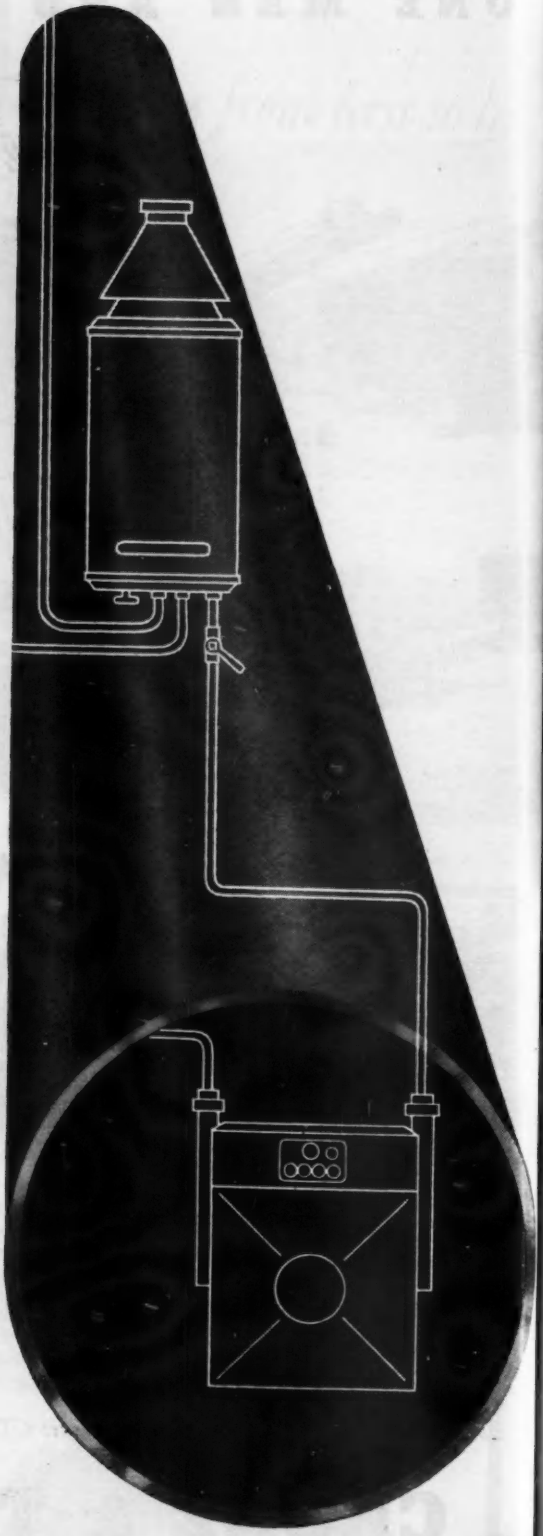

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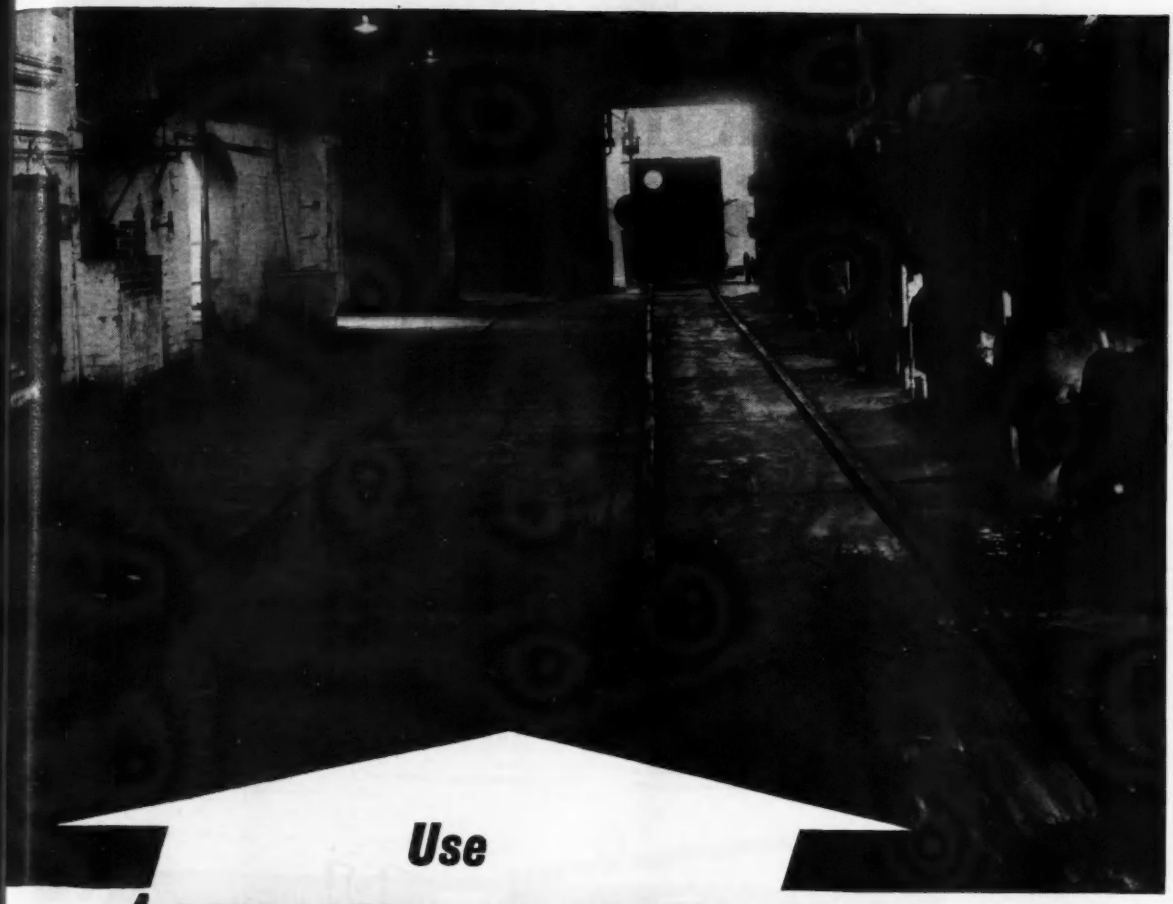

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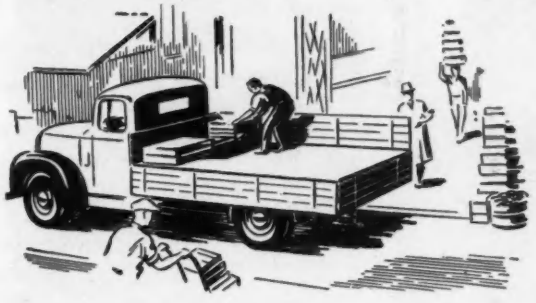

This sturdy, medium-sized truck has features usually found only on bigger and heavier types of commercial vehicles. The cab offers "big truck" comfort including Dunlopillo seating for the driver, double-skin-roof ensuring heat or cold insulation and full-width doors. Its 42 b.h.p. engine supplies plenty of power and is flexible, reliable and economical. At its moderate price the Morris-Commercial 1½ ton truck is remarkable value.

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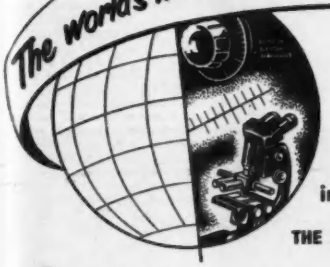

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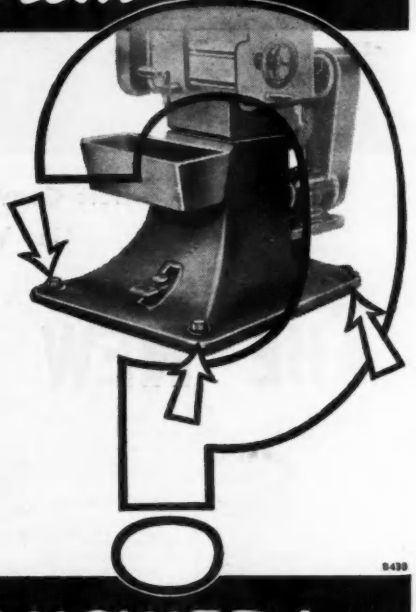

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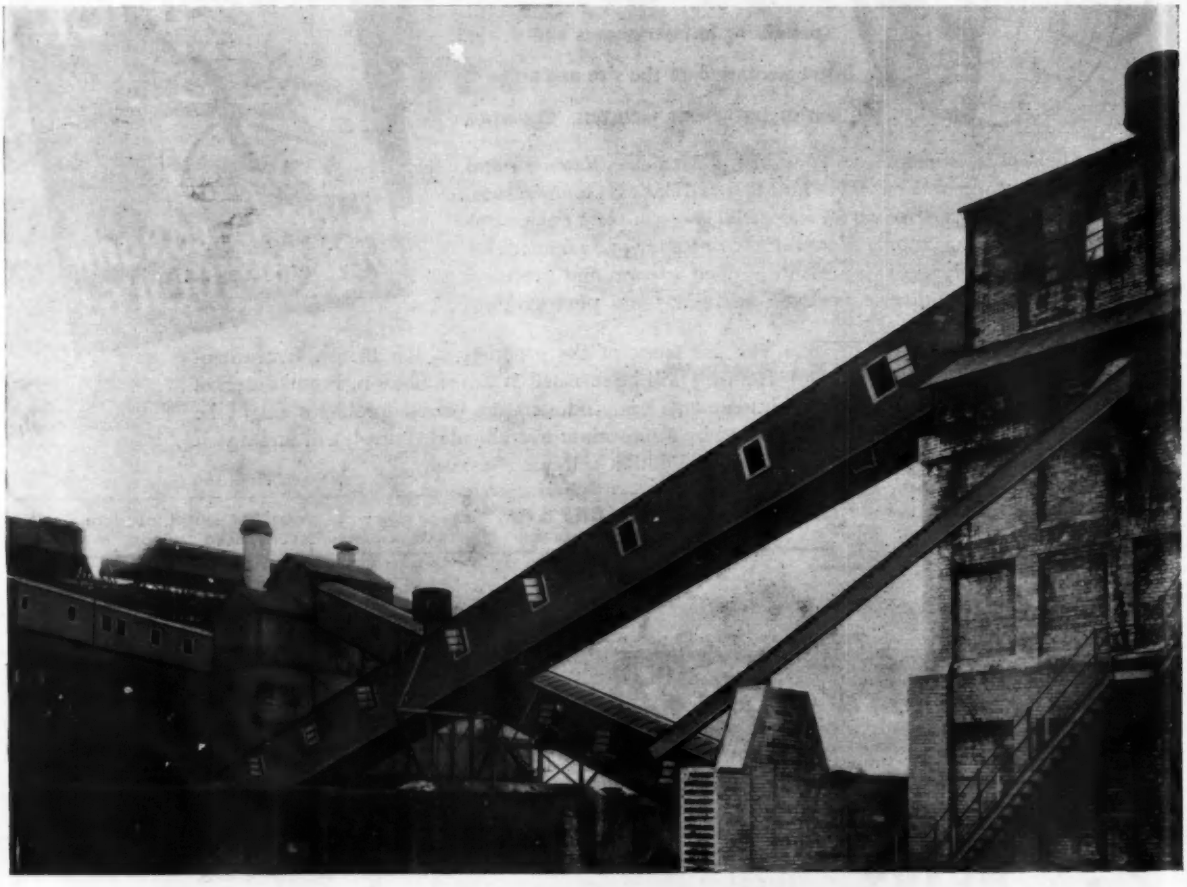

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PAGE

A
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Atlas Preservative Co., Ltd., ...
Autocontrol Boilers Ltd. ...
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Averill, C. R. Ltd. ...

B
Bale & Church, Ltd. ... S4
Balfour, Henry, & Co., Ltd. ...
Begwaco Meters, Ltd. ...
Bell's Asbestos & Engineering, Ltd. ...
Benham & Sons, Ltd. ...
Bolton's Superheater & Pipe Works, Ltd. ...
Booth, John, & Sons (Bolton), Ltd. ...
Brart Colbran, Ltd. ...
Bray, George, & Co., Ltd. ...
Bray, W. E., & Co., Ltd. ...
Bridges, F. W. & Sons Ltd., ... 779
British Flint & Cerium Manufacturers, Ltd. ...
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British Oxygen Co., Ltd. ...
British Rototherm Co., Ltd. ...
British Thermostat Co., Ltd. ...
British Thomson Houston, Ltd. ...
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Broadbent, Thomas, & Sons, Ltd. ...
Brockhouse Heater Co., Ltd. ...
Broom & Wade, Ltd. ...
Brown, J., & Co., Ltd. ...
Bugden, Thos., & Co. ...

C
Cambridge Instrument Co., Ltd. ...
Cannon (Holdings), Ltd. ...
Cascade Water Coolers Ltd. ...
Cementation Co., Ltd. ... 770
Chamberlain Industries, Ltd. ...
Chemical Engineering Wiltons, Ltd. ...
Chemical & Insulating Co., Ltd. ...
Cinema-Televisian, Ltd. ...
Clapham Bros., Ltd. ...
Clayton, Son & Co., Ltd. ...
Clifford Engineering Co., Ltd. ...
Cohen, George, Sons & Co., Ltd. ...
Concrete Proofing Co., Ltd. ... S1
Consolidated Pneumatic Tool Co., Ltd. ...
Cort, Robert, & Son, Ltd. ...
Cowper Penfold & Co., Ltd. ...
Cox & Danks Ltd. ... 764
Crane, Ltd. ... S2
Crone & Taylor, Ltd. ... 775
Crosby & Co., Ltd. ...
Crossley Bros. ...
Curtis, A. L., & Co. ...
Cutler, Samuel, & Sons, Ltd. ...

D
Davenport Engineering Co., Ltd. ...
Davey, Paxman & Co., Ltd. ...
Dawe Instruments, Ltd. ...
De la Rue, Thomas, & Co., Ltd. (Gas Group) ...
Demolition & Construction Co., Ltd. ...
Dempster, R. & J., Ltd. ...
Dempster, Robert, & Sons, Ltd. ...
Derbyshire Silica Firebrick Co., Ltd. ...
Dexion, Ltd. ...
Diaphragm & General Leather Co., Ltd. ...
Dick, R. & J., Ltd. ...
Donkin (The Bryan) Co., Ltd. ... Cover II
Douglas, Robert M., (Contractors), Ltd. ... 774
Douglas, William, & Sons, Ltd. ... 770
Drakes, Ltd. ...
Drew, H. B., Ltd. ... S1
Dunlop Rubber Co., Ltd., (Gen. Rubber Goods Div.) ...

E
E.B. Refractory Cement Co., Ltd. ...
Easiclene Porcelain Enamel Ltd. ...
Edgar, William, & Son, Ltd. ...
Elcontrol, Ltd. ...
Electrofio Meters Co., Ltd. ...
Elliott Bros. (London), Ltd. ...
English Electric Co., Ltd. ...
Ether, Ltd. ...
Eversheds & Vignoles, Ltd. ...
Evode, Ltd. ...
Ewart Chainbelt Co., Ltd. ...
Expanded Metal Co. Ltd. ...

F
F. C. Construction Ltd., ...
Fibreglass, Ltd. ...
Flavel, S., & Co., Ltd. ... 797

PAGE
Fluxite, Ltd. ...
Fowler, John, & Co. (Leeds), Ltd. ...
Franki Compressed Pile Co., Ltd. ... 767
Fraser & Chalmers, Engineering Works ...
Fry's Metal Foundries, Ltd. ...
Fyffe & Co., Ltd. ...

G
Gas Chambers & Coke Ovens, Ltd. ...
Gas Purification & Chemical, Ltd. ... S3
General Descaling Co., Ltd. ...
General Electric Co., Ltd. ...
General Gas Appliances, Ltd. ... 771
Gibbons Bros., Ltd. ...
Gibbons (Dudley), Ltd. ...
Gibson, John, & Son, Ltd. ...
Glover, George, & Co., Ltd. ... 763
Glover, Thomas, & Co., Ltd. ... 784
Godfrey, Sir George, & Partners (Industrial), Ltd.
Goodall Clayton & Co., Ltd. ...
Goodyear Mechanical Goods ... 800
Grant & West, Ltd. ...
Graphite Products, Ltd. ...
Green, E., & Son, Ltd. ...
Green & Boulding, Ltd. ...
Gunite Construction Co., Ltd. ...

H
Hamilton, A. H., & Co., Ltd. ...
Hardman & Holden, Ltd. ...
Harris & Pearson, Ltd. ...
Harris Engineering Co., Ltd. ...
Harrisons (London) Ltd., ...
Harvey, G. A., & Co. (London) Ltd. Facing p. 795
Hawkins, W. T., & Co. ...
Hewitt Construction Co., Ltd. ...
Hick Hargreaves & Co., Ltd. ...
Hilmor, Ltd. ...
Hills (West Bromwich) Ltd. ...
Holmes, W. C., & Co., Ltd. ... Cover I, S5
Honeywell-Brown, Ltd. ...
Horseley Bridge & Thomas Piggott, Ltd. ...
Horstmann Gear Co., Ltd. ...
Howden, James, & Co., Ltd. ...
Humphreys & Glasgow, Ltd. ... 782

I
Ideal Boilers & Radiators, Ltd. ...
I.C.I., Ltd. (Metals Division) ... 776
Inertol Co., Ltd. ...
Ingham, John, & Sons, Ltd. ...
International Combustion, Ltd. ...

J
Jeavons, E. E., & Co., Ltd. ...
Jeavons Engineering Co. ... S2
Jenkins, W. J., & Co., Ltd. ... 773
Jobling, James A., & Co., Ltd, ...

K
Keay, E. C. & J., Ltd. ...
Keith Blackman, Ltd. ... S6
King, Geo. W., Ltd. ...
King, Walter, Ltd. ... S3, S4
Kings Patent Agency, Ltd. ... S3
Kirk & Co. (Tubes), Ltd. ...
Kirkham Hulett & Chandler, Ltd. ...
Kleenoff Co. ...

L
LaFarge Aluminous Cement Co., Ltd. ... 777
Laidlaw, R., & Son (Edin.), Ltd. ...
Lamont, James H., & Co., Ltd. ...
Lanarkshire Bolt & Rivet Co., Ltd. ...
Lancashire Dynamo & Crypto, Ltd. ...
Le Bas Tube Co., Ltd. ... 768
Lionweld, Ltd. ...
Lind, Peter, Ltd. ...

M
Macpherson, Donald, & Co., Ltd. ...
Magnetic Valve Co., Ltd. ...
Main, R. & A., Ltd ... 804, 805
Marco Conveyor & Engineering Co., Ltd. ...
Master Gas Cookers, Ltd. ...
Meigh Castings, Ltd. ...
Meltham Silica Fire Brick Co., Ltd. ...
Mercol Products, Ltd. ... S1
Messenger & Sons, Ltd. ... 764
Metropolitan Leather Co., Ltd. ... 772
Milnes Meters, Ltd. ...
Mitcham Smelters, Ltd. ...
Mitchell, H., & Co. ...
Moler Products, Ltd. ...
Monk, A., & Co., Ltd. ...
Morgan Crucible Co. Ltd. ...
Morris Commercial Cars, Ltd. ... 778

N
National Benzole Co., Ltd. ...
National Enamels, Ltd. ...
New Conveyor Co., Ltd., ... 780
Newton Chambers & Co., Ltd. ... Cover IV
Norwest Construction & Co., Ltd. ...
Nu-Swift, Ltd. ... S3

O
Oakland Metal Co., Ltd., ... S3
Olding, Jack, & Co., Ltd. ...
Oxley Engineering Co., Ltd. ...

P
Parkinson & Cowan (Gas Meters), Ltd. ... 784
Parkinson Stove Co., Ltd. ... 803
Pass, E., & Co., Ltd. ...
Peckett & Sons, Ltd. ...
Peebles & Co., Ltd. ...
Pegson, Ltd. ...
peri Controls. Ltd. ... 783

PAGE
Plus Gas Co., Ltd. ...
Pollock & Peel, Ltd. ...
Power Gas Corporation, Ltd. ...
Pratt Engineering Co. ... S2
Press, William, & Son, Ltd. ...
Pulsometer Engineering Co., Ltd. ...

R
R.T.S.C. Home Sales Ltd. ...
Radiant Heating, Ltd. ...
Radiation, Ltd. ... 798, 799, 809
Rawlplug Co., Ltd. ... 779
Reavell & Co., Ltd. ... 774
Ride & Bell Ltd. ...
Riley, A. J., & Son, Ltd. ...
Roberts, R. E., & Sons, Ltd. ...
Robinson, J. H., & Co. (Liverpool), Ltd. ...
Royles, Ltd. ...
Russell Bros., (Walsall), Ltd. ... 770
Russell, R., & Sons, Ltd. ... S2

S
Salter, T. E., Ltd. ...
Saunders Valve Co., Ltd. ...
Scottish Non-Ferrous Tube Industries, Ltd. ...
Senior Economisers Ltd. ...
Siebe Gorman & Co., Ltd. ...
Sigma Instrument Co., Ltd. ...
Simon-Carves, Ltd. ...
Simon, Richard, & Sons, Ltd. ...
Sisson, W., & Co., Ltd. ...
Slingsby, W., & Co., Ltd. ...
Smith Meters, Ltd. ...
Smith, Thos. & Sons (Rodley), Ltd. ...
Southalls (Birmingham) Ltd. ...
Spence, Peter, & Sons, Ltd. ...
Spencer Bonecourt, Ltd. ...
Sperryn & Co., Ltd. ... 763
Standard Furnace & Setting Co., Ltd. ...
Stanton Ironwork Co., Ltd. ...
Staveley Iron & Chemical Co., Ltd. ...
Stein, John G., & Co., Ltd. ... S6
Steicon (Industrial Floors), Ltd. ...
Stephenson Developments (Hudd.) Ltd ...
Stewart & Gray, Ltd. ...
Stewarts & Lloyds, Ltd. ...
Stoves, Ltd. ...
Strachan & Henshaw, Ltd. ...
Stringer Bros. ... S4
Sugg, William, & Co., Ltd. ...
Summerson, Thos., & Sons, Ltd. ...
Sutcliffe Speakman & Co., Ltd. ...
Sutherland, A. G., Ltd. ...
Sutherland, J. G. & sons Ltd. ...

T
Thomas & Bishop, Ltd. ...
Thomas (Richard) & Baldwins, Ltd. ...
Thompson, John, Conveyor Co. ...
Thorp, Thomas, & Co., Ltd. ...
Tubela Engineering Co., Ltd. ...
Tucker Eyelet, Geo., Co. Ltd., ... 810
Tully, Sons & Co., Ltd. ...
Turners Asbestos Cement Co., Ltd. ... 765

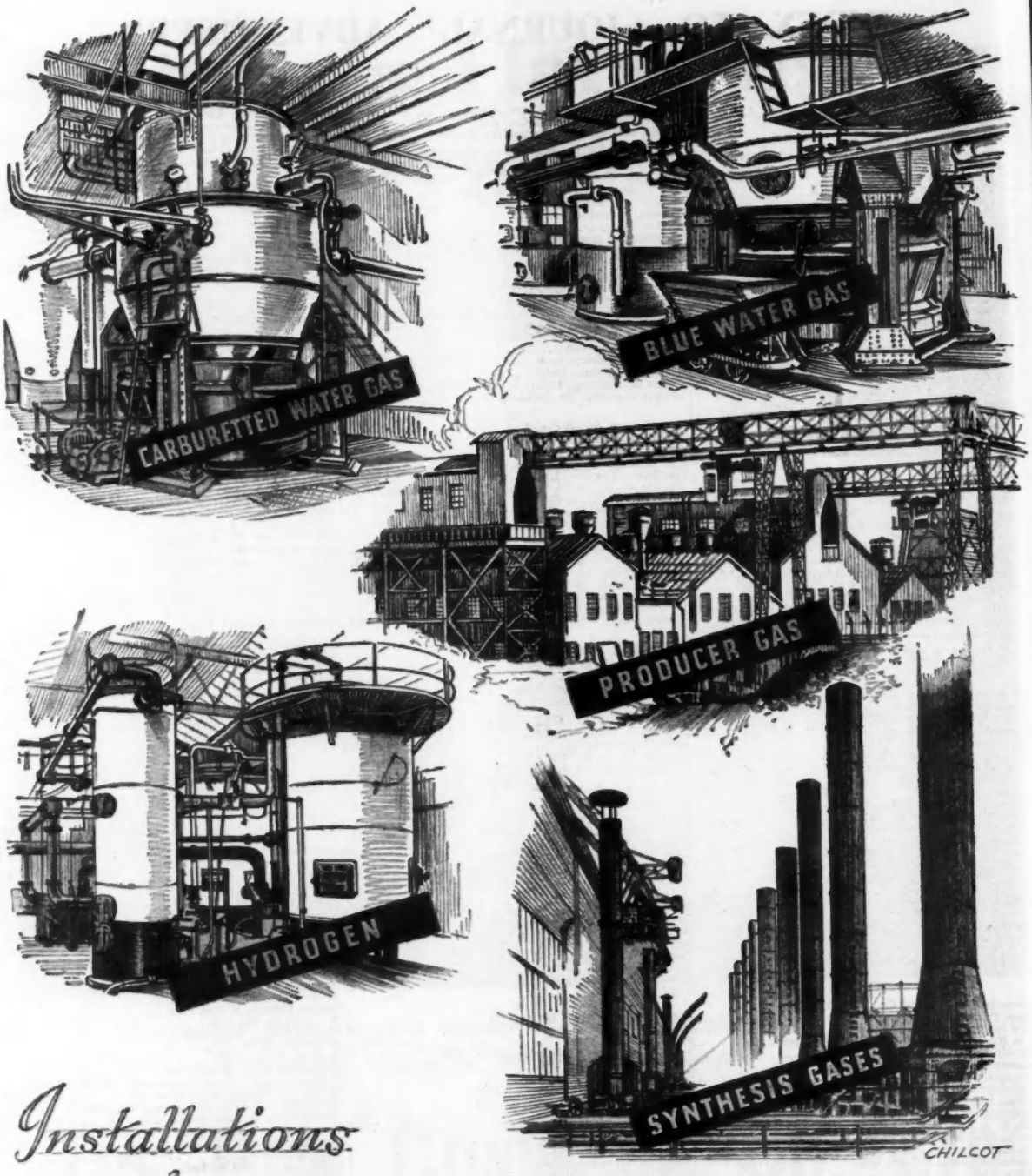
U
Underpressure Engineering Co., Ltd. ... S3
United Kingdom Construction & Engineering Co., Ltd. ... Cover II

V
Vale, Thomas, & Sons, Ltd. ...
Visco Engineering Co., Ltd. ...
Vulcan Stove Co., Ltd. ...

W
Wailes Dove Bitumastic, Ltd. ...
Wakefield, C. C., & Co., Ltd. ...
Wakelin, F. H., Ltd. ...
Walker, C. & W., Ltd. ... 810
Walker, Crosweller & Co., Ltd. ...
Waller, George, & Son, Ltd. ... 769
Ward, Thos. W., Ltd. ... 806
Warsop Power Tools Ltd. ...
Weatherill, F. E. Ltd., ... 766
Webster, H. R., Ltd. ...
Wellington Tube Works, Ltd. ...
Wellman Smith Owen Engineering Corpn., Ltd.
West's Gas Improvement Co., Ltd. ... Cover III
West Hunwick Silica & Firebrick Co., Ltd. ...
West's Piling & Construction Co. ...
Westwood & Wrights, Ltd. ...
Whessoe, Ltd. ...
Whittaker Ellis Ltd., ...
Wilkes, A. H., & Co., Ltd. ...
Willey & Co., Ltd. ...
Williams, John E., Ltd. ...
Williamson Cliff, Ltd. ...
Wilson, George, Gas Meters, Ltd. ...
Winn & Coales, Ltd. ...
Woodall-Duckham Vertical Retort & Oven Construction Co. (1920), Ltd. ... Facing p. 794
Wood, Hugh, & Co., Ltd. ...
Wright, Alexander, & Co., Ltd. ...

Y
Yorkshire Copper Works, Ltd. ...

Agencies ...
Appointments Vacant ... S3, S4
Appointment Wanted ...
Contracts Open ...
Educational ... S4
Fellowship ...
Miscellaneous ... S4
Notice ...
Patents ... S3
Plant For Sale ... S4
Publications ...
Repairs ...



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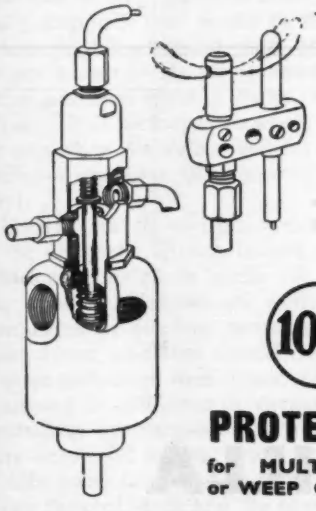

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105th YEAR OF PUBLICATION

EDITOR: NORMAN S. SMITH, B.Sc. (Gas Eng.)

11, BOLT COURT, FLEET ST., LONDON, E.C.4. Telephone: CENtral 2236-7 Telegrams: Gasking, Fleet.

VOL. 274 NO. 4698 June 17, 1953

CONTENTS

EDITORIAL COMMENT

Page

Swan Village ... 785
Steam and Power ... 786
Coal Storage ... 786
Propaganda ... 786

PERSONAL ... 787

OBITUARY ... 787

NEWS OF CURRENT EVENTS

Diary ... 787
London and Southern Juniors ... 788
Electricity to Cost More ... 788
Gas Board's House Claim ... 788
Seventh Film Congress ... 788
Fuel Research Aids Industry ... 788
Gas Fired Incinerators ... 788
Expansion is the Theme for 1953: Women's Gas Federation Reports Further Progress ... 789
South Western Consultative Council ... 791
I.G.E. Residential Course on Management ... 793
Company News ... 812

FEATURE ARTICLES

Bryan Donkin Engineering Through 150 Years ... 790
Mills Packard Sulphuric Acid Plant: A Description of its Operation at the Beckton Products Works of North Thames ... 792
The Manufacture of Gas Fire Radiants ... 794

TECHNICAL RECORD

The Functional Design of Gas and Coke Burning Appliances. By Norman Hudson, Chief Commercial Officer, North Eastern Gas Board ... 795
Gas Industry Productivity: Team Members Compare British and American Practice ... 808

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GAS JOURNAL

VOL. 274. No. 4698 105TH YEAR June 17, 1953

SWAN VILLAGE

MR. T. C. FINLAYSON voiced the reaction of most of those who have read Mr. Hawthorn's excellent paper to the Institution of Gas Engineers on the new Swan Village works of the West Midlands Gas Board. The opportunity of planning a practically complete new works in this country arises so seldom in this advanced stage of the development of the gas industry. He also pointed out the difficulty of useful comment upon a paper which was so largely factual. And he looked forward, as we shall all do, to the day when the author will lay before us the actual results of operation of so interesting a combination of plant.

The site and its environs presented several problems to the designers. It was limited in extent, irregular in shape, and uneven in levels. It was bisected by railway lines which could not well be diverted. It was surrounded by dwelling houses and the local authority insisted that amenities should not be impaired. Most of these difficulties were turned into advantages by what amounted to brilliance in design. The limited space resulted in compactness of layout. The railway lines were developed to feed retort houses and coal stores, to take away coke, and to form a natural division between the coal stack and the retort house and ancillary plant. Insistence on local amenities resulted in good though not fussy architecture, in totally enclosed carbonising plant of high efficiency, and in dust collecting plant which contribute to labour conditions in the modern spirit, and in the somewhat more doubtful resolution to stock only washed nuts on the coal park.

Dr. J. Burns commented on the advantages of a compact arrangement of plant. He gave an instance of 2 mill. cu.ft. daily capacity per acre against the 1 mill. at Swan Village, but looking at the plan one would think that the plant proper—that is, exclusive of the coal and coke storage grounds—is about as compact as it well could be. 'The advantages are fairly obvious—the minimum conveyance of materials whether by pipe, main, rubber belt or rail track.' His designers were even going to the multi-storey system, housing, for instance, pumps and switchgear below the plant they serve.

The proximity of the old Swan Village works, dating back to 1829, presented some advantages. The additional water gas plant could be located there and the combination of the two works facilitated to some extent the distribution of steam and power. And some other services could be more or less common to the two works.

The combination of the continuous vertical retort with water gas with or without carburetting achieves a high degree of flexibility in the face of varying demand and peak load and of variations in the saleability of coke and its price relative to cost of coal. Still more flexibility is achieved at Swan Village by the provision and manipulation of mechanical producers. The arrangement of the carbonising plant in four separate benches is in line with the best modern practice. Each will be shut down in turn for maintenance and repair so that production will alternate from full to three-quarters load, without any of the difficulties arising out of shutting down a portion of a long bench of retorts.

Fuel gas to the retort benches is generated in mechanical 'hot gas' producers. Presumably some form of de-dusting is fitted to these. Five producers are provided, four to do the job, one as a standby. It is interesting to note that not only are the advantages and the economy of a carefully graded fuel to the producers fully recognised but use is made of grading to vary as required the output of producer gas whether to heat the retorts or to dilute the coal gas. The use of the standby producers to deal with exceptional peak loads with no additional labour requirements and for virtually no extra capital is interesting, though the greater cost per therm of carburetted producer gas compared with carburetted water gas precludes its general use.

There was some discussion of Mr. Hawthorn's estimates of the cost per therm with the different combinations of plant. In the first place there was doubt about his premise. Could we agree that 'volumetric production per day is nearly the same at calorific values of 500 and 450 B.Th.U. per cu.ft.? Put the other way, that the thermal output per retort was only nine-tenths at 450 of what it was at 500—a sad reflection on plant

performance with these coals which Mr. Finlayson was not inclined to admit. Mr. R. L. Greaves went further and declared that the premise was contrary to the established and generally accepted fact. He had examined the calculations of cost and had come to the conclusion that this plant should make the therm a little cheaper at 450 than at 500. It would follow that the cheapest therm at 450 is made direct by steaming in the continuous vertical retort. Mr. Hawthorn remained of the same opinion still, but it would appear that he was ignoring the residual heat of the coke, much more effectively recovered by steaming than in any other way, and the internal heating effect of the hot water gas rising in the retort.

STEAM AND POWER

THE steam and power development is very fully worked out at the Swan Village works. A modern tendency is shown in the high pressure and superheat in the waste heat boilers. Operating at 350 lb. pressure these are followed by economisers. Mr. W. R. Garrett doubted the wisdom of this, remarking that in the new Howden plant boilers at 300 lb. pressure were not so fitted. One wonders why Swan Village decided against interconnection of waste gas flues seeing that boilers must generally be stood off for cleaning and inspection at less intervals than the retort benches. The utilisation of the heat in crude gas to raise the temperature of the town-water feed before the softening plant is an interesting novelty. The complete electrification of the works is in line with Birmingham policy, though in this case there is no mention of exporting surplus current to the grid. The use throughout of the simple, robust squirrel-cage motor is rendered possible by the use of the fluid coupling. We shall look forward to the promised further paper on the details of the electrical arrangements.

Further indications of the trend of modern design are seen in the use of hot-gas detarrers before the primary condensers. It was not considered necessary to cool again after the turbo-exhausters where the temperature rise is expected to be only 15°F., an amount which it is anticipated will be comfortably dissipated in the cold-gas detarrer and washing plant. As Mr. K. W. Francombe put it, there was no nonsense about including Livesey washers in this layout. Can we take it that this old-established piece of apparatus is now really on the way out? Ammonia washers are followed by a final oil scrub before passing to the tower scrubbers. To quote Mr. Francombe, 'If tar and oil do get into the oxide after all this treatment, Mr. Avery ought to abandon hope of tar-free oxide.'

The problem of dealing with the effluent from this large concentration of plant is solved by dephenolation and concentration of liquor and by the provision of really large buffer tanks to ensure a regular flow of effluent, with a much reduced O/A value, to the sewers.

COAL STORAGE

THE storage of 18,000 tons of coal on a site of very limited dimensions presented a major problem of handling. The enclosure of the available space by ferro-concrete walls 13 ft. 6 in. high enabled this to be done very neatly. And while coal might perhaps be more elegantly transferred from stock to retort house by conveyors rather than wagons, the use of the overhead travelling crane and grab for stacking and reclamation has much to commend it; though no doubt much the same result might have obtained by the plant suggested by Dr. Burns. On the other hand the bulldozer does not seem right for coal feed to the continuous vertical retort which does not take kindly to fines. Is the constant moving about of so heavy a machine really in line with modern ideas of handling?

The design of the coke screening plant presents some novel features of which the most remarkable is the provision of dry cleaning for the smaller grades. The arrangements of the screens and cleaning tables in two lines above the storage bunkers is not novel but their enclosure to prevent dust emission with a glazed corridor between to protect the attendant is a distinct advance. One wonders why a continuous dust extraction plant was not installed. These plants with collecting points at all changes of direction in the flow of coke have much to commend them.

There will be general agreement that the new Swan Village plant is one of the most interesting erected in recent years. Whether it will be a 'classic' in the sense of setting the fashion for future design is not so clear. So far the data of performance and cost must be somewhat speculative. Mr. Hawthorn owes it to the Institution to come back in two or three years with definite results. We hope he will not confine himself to one pre-determined line of operation but that he will be permitted to try out more than one combination of the several items of plant, the provision of which contributes so much to the flexibiliy of this installation, and lay before us actual data upon which reasoned judgment can be given.

WHAT PROPAGANDA CAN ACHIEVE

THE CORONATION LUNCHEON of the Advertising Association at the Dorchester Hotel, London, last week, was a highly successful affair, and its success was due very largely to the speaker at the luncheon, the principal guest, Mr. R. G. Menzies, Prime Minister of Australia. Mr. Menzies is, of course, a practised orator; he is more than that, he is a man of great stature, high intellectuality. He can combine the robust with charm and delicacy. We think that those assembled on that occasion—and there were many—will for long remember what Mr. Menzies had to say. Here are a few points from his address. No one, he emphasised with a lightness of touch given to few, could produce a real strife between Australia and Great Britain, but there were plenty of mischievous people who might want to produce strife between 'us' and America. The real safety of the world and its real progress in civilisation were largely in the hands of the British Commonwealth and America and nothing must put these two asunder.

He said that in the past 50 years we had lived in a perfect whirl of scientific triumphs, yet some scientist might, in 100 years' time, ask if this was not the most uncivilised half-century of the past 500 years. 'How is it,' continued Mr. Menzies, 'that we have fallen from war to war, hatred to hatred, and lived in a world perpetually filthy with the propaganda of hostility? We have thought too little about the greatest problem in the world—of reconciling man with man and man with his Maker. These are the great problems of life and on these we must confess to the most terrible failure in our own lifetime. I would like to think that in the second half of this century we used

some of these remarkable talents to advance the cause of understanding, not hostility, of friendliness, not hatred.'

Mr. Menzies went on to discuss the meaning and purpose of propaganda. Just as evil propaganda, he said, was the easier, so we must choose the harder way and make our propaganda of friendship and understanding. It was not enough to be expert in the art of persuasion. It was immeasurably more important to be expert in those things in which we desired to persuade people, always choosing those things which led to peace and understanding and despising those things which led to bitterness and division. Propaganda, he suggested in a brilliant speech marked by simple sentiment, was running the risk of becoming dangerous and lopsided.

Personal

Mr. C. ROBSON, a Director of Ashmore, Benson Pease & Co., Ltd., Stockton-on-Tees, has been elected Chairman of the Teeside Productivity Committee.

Miss B. GILLEY, M.C.A., Home Service Adviser, Torquay Sub-Division of the South Western Gas Board, has been appointed to the Torquay and District Hospital Management Committee.

Mr. HARRY TOPHAM, who recently celebrated his golden wedding anniversary, was chief meter inspector on the staff of the Nottingham Corporation Gas Department, by whom he was employed for 53 years before his retirement in 1946.

Mr. JOHN HALL, Cashier of the Glasgow Division of the Scottish Gas Board, has retired after 52 years in the industry. He began as an office boy at the Dawsholm gasworks, then under the control of Glasgow Corporation.

Mr. P. T. BLISS has been appointed Sales Director of G. A. Harvey & Co. (London) Ltd. Mr. Bliss, who is a Member of the Incorporated Sales Managers' Association and the Incorporated Advertising Managers' Association, joined the company in 1909, and has been Sales Manager for a number of years.

Mr. WILLIAM KIRK, District Engineer and Manager, was honoured by the staff at Motherwell when he left to take up a similar post at Greenock. Tribute to his work was paid by Mr. A. P. Lockhart, accountant, and a table lamp, fountain pen, and a lady's handbag (for Mrs. Kirk) were presented by Mr. John Sorley, deputy engineer.

Mr. V. R. W. YOUNG, of Solihull, has been appointed Education and Training Officer to the West Midlands Gas Board, and will take up his appointment on July 1, his 31st birthday. Since August, 1951, he has been Education, Training and Welfare Officer to the Midlands Division of the British Electricity Authority.

Mr. D. C. E. POOLE, Technical Director of George Wilson Gas Meters, Ltd., has received the award of a Coronation Medal, which was presented to him by Alderman Mrs. Pearl Hyde, M.B.E., on June 3. The medal was awarded for services rendered to the Coventry City Special Constabulary, in which Mr. Poole, who is now Section Commander, has served since 1930.

Mr. F. CURT SMITH, Founder and Chairman of the Visco Engineering Co., Ltd., Croydon, has retired from active participation in the business after 32 years with the company. Colonel G. MALLETT, M.C., T.D., has been elected to the Chairmanship in succession to Mr. F. Curt Smith. Mr. FRED C. SMITH will continue as Managing Director. The company was founded by Mr. Curt Smith in 1921 to develop the Visco air filter, the first all-metal filter using oil film covered surfaces to be placed on the English market. The word Visco is derived from the viscous oil used on the filter ferrules to trap the dust.

Mrs. W. KADER, Deputy Chairman, has retired from membership of the North Thames Gas Consultative Council.

Mr. B. H. HOLLAND, M.SC., of the Department of Coal Gas and Fuel Industries with Metallurgy, University of Leeds, has been awarded the Institute of Fuel Students' Medal and Prize for 1952 for a paper on 'The Structure and Stability of Flat Burner Flames.' Mr. Holland was born at Boston, Lincolnshire, in 1929, and after education at Boston Grammar School he proceeded to the University of Nottingham, where he graduated B.SC. in 1950. He then undertook research under Professor A. L. Roberts at the University of Leeds, and in 1952 was awarded the M.SC. degree in fuel technology. For the past year Mr. Holland has been a research assistant to the Joint Research Committee of the Gas Council and the University of Leeds.

Mr. E. G. STEWART, Group Engineer controlling the North Thames Gas Board's stations at Brentford, Fulham, Kensal Green, Mill Hill, Southall, and Hornsey, has retired after 44 years' service with the Board and its predecessor, the Gas Light and Coke Company. Before his appointment as Group Engineer in 1946 he spent five years as Station Engineer at Fulham, a works which knew him as far back as 1913, when he was junior assistant engineer there. From 1931 to 1941 Mr. Stewart was head of the property maintenance department, an appointment which followed a term of six years as assistant chief engineer, and another of three years as personal assistant to the late Mr. Thomas Hardie, Chief Engineer. He originally began as a staff pupil of the Gas Light and Coke Company and in his early years he served at Ilford, Nine Elms, Kensal Green and Beckton. He designed the layout of reconstructions at Brentford, Bow Common, and Nine Elms, and was responsible for conversion of buildings at Imperial House, Watson House, Mill House, and Malcolm House, and was concerned with the construction of the Vincent Street hutments. Holder of the Institution of Gas Engineers H. E. Jones Medal, Mr. Stewart has for the past 16 years been chairman of the editorial committee of the *Thames Gas Magazine*, and he has served on many official and engineering committees. In his retirement he is to continue with the preparation of exhibits for the Gas Gallery of the Science Museum at Kensington.

The Oakland Metal Co., Ltd., have removed to more spacious offices. Their new address is 142, New Bond Street, London, W.1, and the telephone number and telegraphic address remain unchanged at GROsvenor 5241/4 and Amomet, Wesdo, London.

Diary

June 20.—MANCHESTER JUNIORS: Ladies' Day at Windermere. Bus ride to Langdales or visit to Gasworks optional.

June 20.—LONDON JUNIORS: Ladies' Day and Summer Visit to Cambridge.

June 20.—WALES JUNIORS: Summer Meeting and Ladies' Day: Visit to Whitland butane/air gas plant, followed by lunch, Royal Gate House Hotel, Tenby.

June 24-26.—BRITISH WOOD PRESERVING ASSOCIATION: Third convention Trinity College, Cambridge.

June 25.—NORTH THAMES G.C.C.: Caxton Hall, S.W.1.

June 26.—MIDLAND SECTION, I.G.E.: Summer Meeting, Wolverhampton, 11 a.m.; luncheon, Wulfrun Hall, 12.45 p.m.; alternative visits to Goodyear Tyre & Rubber Co., and Bakers Nurseries.

June 26.—NORTHERN JUNIORS: Annual General Meeting, Seaburn Hotel, Sunderland, 2.30 p.m. Presidential address of R. Williamson.

June 27.—WESTERN JUNIORS: Summer Meeting and Ladies' Day.

July 1.—SOUTH WESTERN SECTION, I.G.E.: Summer Meeting and Ladies' Day. Torquay.

July 3.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Chairman's Day, Preston.

July 7.—EAST MIDLANDS G.C.C.: Victoria Station Hotel, Nottingham, 11.30 a.m.

July 30.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, W.C.2.

Obituary

Mr. JAMES MINES, who was employed for 30 years as a fitter with the old Bradford-on-Avon Gas Company, has died, aged 77.

Mr. J. R. WAGGETT, for 40 years a worker in the Bradford (Yorkshire) Gas Department; died at Bradford on June 9 at the age of 85. Mr. Waggett was once secretary of the Bradford branch of the Gas Workers' Union. He retired in 1932. He was a member of the Manchester Unity of Oddfellows, becoming Provincial Grand Master in 1921.

The Caption under the photograph on p. 645 of the June 3 issue of the *Journal* should read—J. M. Quigley, Gas Chambers and Coke Ovens, Ltd.; A. E. Morris, Gas Chambers and Coke Ovens, Ltd.; G. E. Anderson, Newcastle, Northern Gas Board.

LONDON AND SOUTHERN JUNIORS

THE annual general meeting of the London and Southern Junior Gas Association was held at the North Thames Gas Board's offices in Edgware Road on May 29, when the officers for the ensuing session were elected as follows: President, W. Johnson; Senior Vice-President, E. W. B. Dunning; Junior Vice-President, N. R. Junkison; Hon. Treasurer, D. G. Winslow; Hon. Secretary, J. D. Grant; Assistant Secretary, J. V. Rigg; Members of Council, J. E. Gray, R. K. Harrison, J. B. McKean, J. A. Nichols, C. H. Purkis, P. C. Savage, N. T. Wait, and A. J. S. Wiseman.

The announcement of the retirement of Mr. J. E. Gray from the Secretaryship was received with general regret, and in appreciation of the excellent service he had given to the Association over a period of several years it was agreed to make a presentation to him at the opening meeting of the next session.

The annual report and accounts were adopted and the Association unanimously agreed to make its usual donation of 10 guineas to the Benevolent Fund of the Institution of Gas Engineers.

The PRESIDENT presented the Milbourne prize to Mr. D. R. Wills for his paper on 'Intermittent Space Heating,' presented in March, and the S.B.G.I. silver medal to Mr. F. W. Lockwood and Mr. D. J. Davies for their paper on 'Town Gas High Temperature Radiant Heating in Industry,' presented last November. This paper had also gained for them the William Dieterichs memorial prize offered by the Institution of Gas Engineers.

The PRESIDENT also presented the President's Prize to Mr. C. H. Taylor for his short paper on 'The Effects of Air Vitiation on the Combustion of Instantaneous Bath Water Heaters,' presented in January.

A vote of thanks to the Technical Press, proposed by Mr. C. H. PURKIS, was acknowledged by Mr. A. C. CROSS (*Gas Journal*).

The meeting closed with the formal induction by Mr. Shann of his successor, Mr. W. Johnson, as President. Mr. JOHNSON briefly acknowledged the honour conferred on him and invited suggestions for the programme for the coming session.

After the annual business the meeting discussed the report of the Gas Industry Productivity Team which visited the United States in 1952. A report of the discussion, opened by Mr. J. A. HEPWORTH and Mr. L. F. RANDALL, two members of the team, is published on pp. 802-812 of this issue. The meeting was one of the longest on record.

Seventh Film Congress

AFTER the sixth congress of the International Scientific Film Association, in Paris last year, it was agreed that this year's congress should be held in London. First details are now available and the Council of the International Scientific Film Association has just announced that the congress will be held from September 18 to 27, in the National Film Theatre and Royal Festival Hall, S.E.1. There will be meetings of the general assembly of the International Scientific Film Association, meetings of the permanent committees dealing with medical, research, technical and industrial films, as well as the usual festival of scientific films.

A committee of the British Scientific Film Association will be set up to recommend films for submission to the festival. In order that this country shall be properly represented, films should be viewed in good time; producers are asked to indicate whether they will be willing to provide copies for this purpose, and later for exhibition in London.

In addition, the Association would be glad to have details of research and record films of specialised types, which need not necessarily be in the form of complete titled films, for showing at meetings of the permanent committees.

Electricity to Cost More

OVER 500,000 electricity consumers in South Eastern England will pay more as the result of the standardisation of tariffs by the South Eastern Electricity Board, announced on May 26. The unit charge remains at a penny, but one domestic tariff will be introduced from January 1, 1954, to replace the 50 tariffs now used.

On the introduction of the new tariff, 323,000 consumers will receive credits amounting to £240,000, and 103,000 consumers will pay adjustment charges totalling £40,000.

The new tariff will apply to about 700,000 consumers, of whom 200,000 will pay less or the same as they are paying now. The additional revenue from the new tariff will be £115,000 in the first year, and £190,000 annually.

Gas Board's House Claim

REFUSING to grant to the East Midlands Gas Board possession of a house at Brigg occupied by a former stoker employed by the local gasworks before nationalisation, Judge R. S. Shrove said at Brigg, Lincolnshire, County Court, on June 3 that he found the house remained the property of the local authority, and that the Gas Board had failed to satisfy him that there had been a transfer of tenancy rights from the council to the board. It followed that the application had been made by the wrong people, and if the District Council decided to serve notice to quit on the tenant, and applied for possession, he would be obliged to grant the application. He awarded costs against the Board.

Mr. N. C. Hilditch, for the Gas Board, said that the Board needed the house for another stoker, and submitted that, while the freehold remained the property of the District Council the tenancy rights had passed to the Board on nationalisation, by tacit consent.

FUEL RESEARCH AIDS INDUSTRY

SPEAKING as president at the annual meeting of the British Coal Utilisation Research Association on June 8, Sir Charles Ellis, F.R.S., scientific member of the National Coal Board, said that the Association could give many specific examples of the extent to which they were now feeding the fruits of their research back into industry. An Association such as theirs could only endure if it was productive. Their products were technical knowledge, experience, new results and new equipment.

They had been investigating the possibilities of surmounting one of the serious problems of today, how best to use the finer sizes of coal, often with an ash content appreciably above the average, by burning such coal by a cyclone method to provide the hot gases for driving a gas turbine. A prototype based on the second experimental combustion chamber on which they had worked in the Association laboratories was already undergoing development in the works of a member firm. The result of research into the utilisation of fines (small coal), had resulted in the N.C.B. taking up a licence on commercial terms to develop the Association's method of preparing slurry pellets for firing pithead boiler plant.

The Association's automatic control of gas producers was under development by the glass and steel industries and numerous domestic appliance-design features had been taken up by manufacturers.

Sir Charles said membership of the Association now included over 130 private firms and groups and over four great national industries; it was indeed a genuine partnership in which every member could participate to the measure of his own interest and willingness to help. They had built a programme of research which touched national life at every point, from steam raising in industry to heat service in the home. Moreover, this programme now had an intrinsic momentum; problems were flowing in from industry and ideas and services were flowing out into industry.

Commenting on the report of the Ridley Committee, Sir Charles Ellis said that the report had recommended that industry should be invited to set up an organisation to provide a fuel efficiency advisory service. 'We can claim to have provided through our researches much of the essential fundamental data on which service of this kind can be based,' he said.

Gas Fired Incinerators

INCORPORATION of gas fired incinerators in the new 10-storey housing project at Moss Heights in Glasgow is an interesting application of gas to reduce subsequent labour in refuse disposal. The three blocks of flats are equipped with refuse chutes located on each floor, and designed to allow direct disposal of daily refuse to the ground level, without the need for continuous traffic up and down 10 storeys. Since the chutes could easily choke if excessive bulk were sent down, the policy adopted has been provision of an individual incinerator in each flat. These are built-in Sugg units supplied in co-operation with the Glasgow Division of the Scottish Gas Board. Since each kitchen in the Moss Heights scheme is serviced for gas cooking, gas for incineration is a natural sequence. Use of the individual units by each tenant will reduce tremendously the volume of bulky waste sent down the chutes, give a much more regular type of waste, in ash form, and thus reduce the work of the cleansing department to a major extent. The refuse from such a large block of flats would keep a cleansing unit at work continuously.

Expansion is the Theme for 1953

Women's Gas Federation Reports Further Progress

MAKING a great personal success with her audience, Dame Enid Lyons, G.B.E., widow of the former Prime Minister of Australia and the first woman to be elected to the Australian Federal Parliament and to hold Cabinet rank, was guest speaker at the Women's Gas Federation's Annual General Meeting at Caxton Hall on June 9. In the view of many present at the meeting, she 'made the day,' particularly as the Minister of Fuel and Power, who was scheduled to speak, was detained at the House.

Dame Enid spoke of the Coronation, of the British tradition, and her own impressions of being in London at such an historic time—'an experience thrilling beyond words.' She described the Federation as 'a group of organised women.' That might sound very feministic; she hoped it did. Women never had any doubt of their value in the world. 'Whenever you see women being organised for any ostensible purpose, you may be sure there is someone there who appreciates their quality.'

At the beginning of the meeting the Chairman, MISS K. M. HALPIN, O.B.E., President of the Women's Gas Federation, had spoken of the new Elizabethan era and the Federation's plans for the future. Last year, she said, their theme had been Reconstruction and Consolidation; this year the theme was Expansion. The Federation continued to make good progress, the final strengthening being the appointment of the new Organising Secretary, Miss Jessie Frith, and it was now up to them all to make new machinery to fit a future both of promise.

'Calm Before Everything'

The Executive Committee's nomination of Miss Halpin as President for the coming year was proposed by MISS O. L. HUMPHRIES, the Committee's Chairman, and seconded by MRS. G. ABBOTT, who recalled how, 18 years before, Sir David Milne-Watson had selected Miss Halpin to direct the affairs of the then Women's Gas Council; time had shown how wise had been his choice. Her new honour, C.B.E., might well mean 'Calm Before Everything.' The proposal was adopted.

Continuing, Miss Humphries described the progress achieved by the Federation during the year. The target of 10 new branches for the year had been exceeded by five, and this total of 15 new branches was a record for any year since the war. Educational activities had also been successful, and a total of 520 teachers had attended the courses for homecraft teachers organised by the Federation. Miss Humphries also referred to the Youth in the Kitchen competition, which promised to be a worthy successor to Festival Fare and International Kitchen, and stressed the importance of this event in that it concentrated attention on the housewives of tomorrow.

During the meeting the existing Vice-Presidents were re-elected *en bloc*, with the addition of Miss C. E. Ellington Wright, M.B.E.

The more serious 'meat' of the day was provided by COLONEL SIR HAROLD SMITH, Chairman of the Gas Council, who addressed those present on 'The Gas Industry and Coal Conservation.'

With over 11¼ mill. homes using gas today for one purpose or another, remarked Sir Harold, it might be said that 'the hand that rocks the cradle' was the same as that which turned on the taps on the gas cooker. A great deal of the work of the gas industry was devoted to seeing how labour could be saved and comfort increased in the homes of these millions of women. It was at this point that the Women's Gas Federation operated as a most useful link between the area gas boards and their domestic consumers. One of the dangers associated with a large public utility undertaking (an even greater danger now that they were operating under State ownership) was that it might end to become bureaucratic and soulless. The personal touch between supplier and consumer was apt to get lost, and it was one of the functions of the Federation to keep that friendly, personal relationship alive.

Another way in which they helped not only themselves, but their fellow women, was by working towards a higher standard of home life. By keeping its members up-to-date with new ideas on home planning and information on the latest labour-saving equipment, the Women's Gas Federation was sending out thousands of ambassadors, who could pass this information on and thus influence a very much wider public. Sir Harold said that he was glad to know that during the last year they had continued to make steady progress and that their spheres of operation had been extended by the addition of 15 new branches. At the same time, there was still plenty of room for further expansion. The Federation's membership comprised no more than a small percentage of the many million women who relied on gas.

Turning to the problems of coal conservation, he thought it was probable that solid fuel would continue for some years to come to carry out the combined tasks of warming the living room and heating the water in many homes during the winter months. But that solid fuel need not be the maker of dirt and unnecessary work in the home and a producer of smoke and smuts outside it. Sir Harold dealt briefly with the advantages of coke as a domestic fuel.

Since the gas industry passed into the ownership of the State in 1949, it had had to face a period of shortages of materials and rising prices. The price of coal reaching the gasworks today was almost four times what it was in 1939, but this increase had not all been passed on to the public. The average price of gas today was not even double its pre-war figure, and the gas industry was, he thought, entitled to congratulate itself on that fact. It had done, and was doing, a great deal to improve its services to the public and to recover even more of the total potential heat value in the coal of which it used some 27 mill. tons a year.

But the price at which gas was sold must depend very largely on the price the gas industry had to pay for coal and the quality of the coal made available to it. Some coals were more suitable for carbonisation than others, but during recent years, gasworks had been called to accept large amounts of coal which could only be used with some loss of efficiency. At the same time, coal well suited for carbonisation was being burned in appliances for which other types of coal, or coke, would be suitable. Much better use of this coal could be made at the gasworks and, in turn, the householder would get greater benefits from the gas and coke it would produce. Suppose, for a moment, said Sir Harold that the argument he had been putting forward were to be implemented. What would be the long-term result? First, there would be less raw coal used in the nation's homes and in industry. Secondly, pollution from smoke would be reduced. Thirdly, higher standards of comfort and cleanliness would obtain in homes of all classes. Fourthly, there would be ample supplies of gas and coke for industry at competitive prices.

Our photograph, taken at the eighteenth Annual General Meeting of the Women's Gas Federation, shows, **right to left:** *Lady Chatterjee (Vice-President, W.G.F.), The Lady Nunburnholme (Past President, W.G.F.), Mrs. G. Abbott (Executive Committee), Dame Vera Laughton Mathews (Adviser on Women's Affairs, Gas Council), Mr. F. G. Brewer (Secretary, Gas Council), Col. Sir Harold Smith, K.B.E., D.L. (Chairman, Gas Council), Miss K. M. Halpin, C.B.E. (President, W.G.F.), Dame Enid Lyons, G.B.E., Miss C. E. Ellington Wright, M.B.E. (Past Chairman, WG.F.), Miss O. L. Humphries (Chairman, Executive Committee).*

PUBLICITY IN THE GAS FIELD

Bryan DONKIN Engineering

a fine book tells the story of 150 years

THE Bryan Donkin Company has just published *A brief account Bryan Donkin, F.R.S., and of the Company he founded 150 years ago.* This book marks the completion of the Company's unbroken service to international industry over the last century-and-a-half. It does so by sketching the intensely interesting historical background of the organisation, and throwing against it, in high relief, a few of Donkin's outstanding achievements in the field of mechanical invention and construction.

Bryan Donkin was a pioneer in many fields. He invented the first practical paper-making machine and developed it into a commercially workable proposition during the first decade of the 19th century. Forty years later, 191 of Donkin's paper-making machines had been made and erected. They were producing paper in every civilised country in the world. The principles, and indeed the design, of Donkin's first machine are still evident in the paper-making machines being constructed today. Paper ranks high in the list of commodities without which humanity's physical development and cultural uplift could never have progressed. Donkin's contribution to the provision of ample supplies of cheap paper deserves the clearest recognition.

Donkin's inventive genius was as versatile as it was fertile. Machine tools, taps and dies, canals and water wheels, the bar lathe, steam engines, pen nibs—the development of all received incalculable impetus from Donkin's efforts. The preservation of food by the canning process attracted Donkin's attention, and there is a record of his venturing, with some success, into the canned-meat trade.

Donkin's work on paper-making machines led him, not illogically, to take an active interest in the development of printing machinery. Not only rotary presses for ordinary kinds of printing, but specialised equipment for the production of banknotes, stamps and other forms of official security printing.

It was the gas industry's loss that Donkin came into it only late in life. He developed the rack-and-pinion valve in 1847—a mere eight years before his death. But his sons continued the work their father had begun, and during the ensuing years built more and more valves in larger and larger sizes. Valves of a design having the basic principles devised by Donkin senior are being made today.

The Donkin influence on the gas industry was further reinforced by the manufacture of gas exhausters, beginning with the patent by Bryan Donkin (the son) and D. W. Farey in 1856 for a rotary engine consisting of a disc set at an angle to its axis, and rotating in a casing that was part of a sphere.

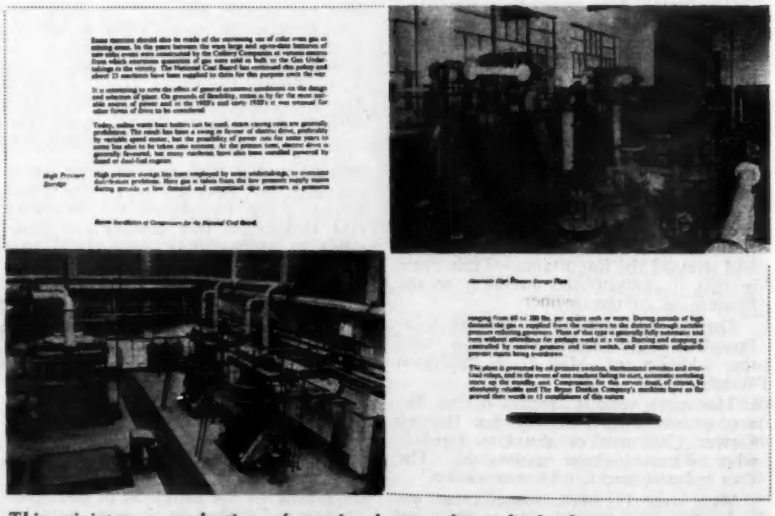
Bryan Donkin junior did considerable research into the burning of coal. In 1896 he wrote what must have been one of the earliest papers on the use of pulverised fuel—or powdered coal as it was called at that time.

In more recent years the Donkin organisation has been closely associated with the development of exhausters and blowers, and the construction of high pressure gas storage and supply equipment.

Such, in brief outline, is the story the book tells. It is a good story, made better by being soundly reinforced with ample illustration, and presented in a typographical style that is little short of elegant.

Those who are print-conscious will appreciate these details: The size of the book is reduced demy 4to. It contains 70 pages and they are nicely bound in a stiff board case covered in a material of rich dark blue, embellished by an embossed reindeer finish. The decoration on the front cover, a beautifully executed relief cameo of Bryan Donkin in heavy bronze foil, accords the book distinction of a high order.

The text pages, with one exception, are printed throughout by the photogravure process, than which no other can yield a more accurate reproduction or pleasing result, when it is applied expertly. The exception referred to above is the frontispiece on which the four-colour letterpress half-tone process has been used to reproduce excellently an oil painting



This miniature reproduction of a pair of pages from the book gives an indication of the quality of illustration and the satisfactory arrangement of pictures and text matter. The ornamental rule at the foot of the right-hand page is in blue.

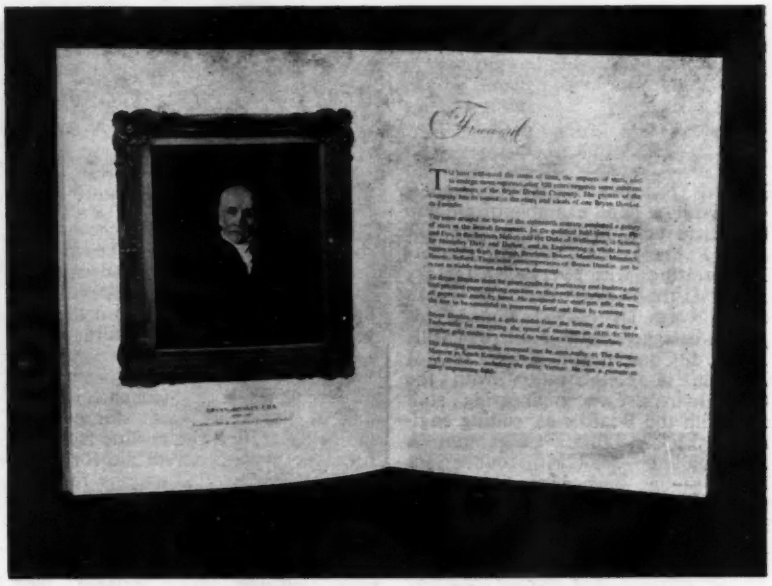
of Bryan Donkin, complete with its ornate gold frame.

The type matter is arranged tastefully and with due regard for those finer points of typography which make for easy reading. The text illustrations comprise full-tone photographs, squared-up, cut-out and vignetted; thumb-nail sketches, diagrams and line drawings. There is also a reasonably facsimile reproduction of some pages of Donkin's diary. The photogravure process has coped well with this pleasing mass of variegated pictorial matter.

The satisfactorily æsthetic arrangement of such a wealth of assorted subjects requires great skill and it is a tribute to the designer of the book that he used a second printing, in blue, to add solid and stippled backgrounds and surrounds which serve so adequately to strengthen the force of the illustrations and add pleasing liveliness to the presentation.

Gas men will accord unstinting praise to the final endpaper. It depicts in a form diagrammatically functional, yet appropriately decorative, the application of the Bryan Donkin Company's products to the production and distribution of gas.

To praise a book without acknowledging its producers is a policy practised in places where positive reality is masked by a policy of often unnecessary super-discretion. But since these pages do not emanate from one of those places, let us be forthright and say that the credit is due to Messrs. Cross-Courtnay, Ltd., the advertising practitioners in Manchester. As for the printer, for whom we have the greatest admiration, somebody's modesty leaves us with nothing to say except that the book was 'printed in England'—for that is all the imprint has been allowed to announce.



The book opens with this handsome pair of pages. The illustration is in colour—the gilt frame being reproduced to convey the full distinction of the portrait. 'Foreword' and the dropped initial on the right-hand page are printed in blue and give the page typographical quality.

In our opinion '*A brief account of Bryan Donkin, F.R.S., and of the Company he founded 150 years ago*' is a good book, delightfully written and excellently produced. Whether it is presented as advertising, publicity, prestige or that ambiguous factor 'public relations' we cannot determine. Our endeavours in this direction were thwarted by the rather coy announcement in small italics on the preliminary page to the effect that the price of the book is one guinea.

It is infinitely sad that Mr. D. M. Henshaw, Chairman of Directors of the Bryan Donkin Company, did not live to see the completion of this book. He was keenly interested in its publication, had taken great trouble to verify all the historical data of the earlier years and had read all the proofs. He passed away suddenly, following an emergency operation, in London on February 6, 1953.

As much of the book was engraved and on the press prior to his passing, the Board of Directors felt it to be most fitting that it be completed in the form he had approved and that the foreword bearing his signature remain as a lasting reminder of his life-long service to the gas industry.

South Western Consultative Council

WHEN the South Western Gas Consultative Council met at Taunton on June 10 two lady members said they were tired of hearing that they were paid £500 a year for their services on the Council. They were not paid at all. The Secretary (Mr. A. R. Murrell) stated that no remuneration was paid to members of the Council and subsidiary bodies, except to the Chairman, who received a salary as a part-time member of the Gas Board. Expenses of members were limited to travelling, subsistence, and actual loss of wages, the maximum being limited by a scale authorised by the Ministry of Fuel and Power. Many members declined to claim what would properly be payable.

Members complained of 'ineffective presentation' when specimens of Gas Board advertisements were examined. Mr. E. W. Fry (Bampton, Oxon.) said he tried the experiment of showing the adverts to university students who were getting married and asked whether they would be encouraged to buy gas.

'I will not tell you what they said, but it boiled down to the fact that those advertisements would not make them buy gas,' he said. 'Frankly, they are not attractive enough.'

The Chairman (Mr. A. W. Loveys) said the advertisements appeared in 88 local papers.

Mr. L. G. Northcroft (Cheltenham): 'It is a pity they are not very much better as advertisements. Good points in them are badly presented.'

A letter from the Ministry gave information about steps taken at the Mint to overcome a shortage of shillings, which had caused inconvenience to users of gas and electricity supply meters. Mr. G. W. Powell (Stroud) said he thought some of the old shillings should be withdrawn because they were much too thin to operate on the meters.

Criticisms and suggestions made in the Fabian pamphlet, *Consumers Councils*, were referred to by Mr. H. Morland (Glastonbury), who said the pamphlet had been investigated by the tariff subcommittee. Mr. Morland said they found the pamphlet stimulating, but the only issue on which they agreed was that the secretary of the Consultative Council should be responsible to that council and in no way to the Gas Board. He should not be an official of the Board seconded to the Council.

The Fabian Society also believed that members' expenses should be paid out of a separate fund, so that they should not feel they were on the Gas Board pay-roll.

On the question of the Council meeting on gas board premises, Mr. J. D. Duncan (Wells) maintained that it gave the general public the impression that the Council was part of the Gas Board machinery.

Mrs. E. J. Exelby (Redruth): 'It is only the enquiring public who know where we meet.'

Mr. L. G. Northcroft (Cheltenham): 'It is only the very enquiring public who know that we exist.'

The Council rejected a proposition by Mr. Duncan that periodic contacts between representatives of the gas and electricity councils would be in the interests of the consumers.

Mills Packard Sulphuric Acid Plant

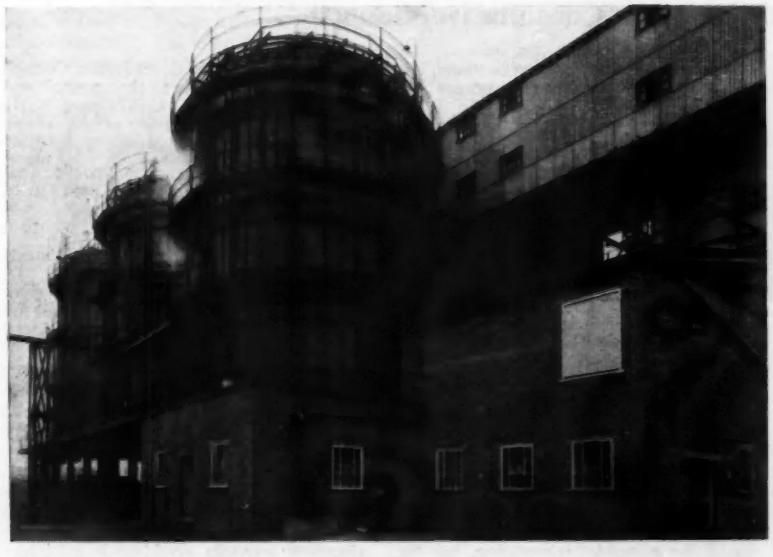
A description of its operation at the Beckton Products Works of North Thames

MAKING use of gasworks spent oxide, a good example of modern sulphuric acid plant employing the Mills Packard water cooled chambers is operating with very satisfactory results at the Beckton Products Works of the North Thames Gas Board. This plant, designed and built by Mills Packard Construction Co., Ltd., of Ipswich, in collaboration with the Gas Board's own engineering staff and with the Board's consulting engineers, Messrs. Brian Colquhoun & Partners, who dealt with foundations below ground and certain sections of the mechanical handling plant, went into operation a little more than 12 months ago. It was arranged in the first instance for an output of 30 tons H_2SO_4 (calculated at 100%) per 24 hours, to be ultimately increased to 45 tons in 24 hours. With the initial stage of construction 75% completed, the demand for acid was such that it was decided to proceed as quickly as possible with the second stage, to produce the full output of 45 tons per day. The extension was completed and the plant in full production within three months from starting up the first section.

Mechanisation to Assist Operation

In addition to synchronising with the works extensive rebuilding programme and site layout, one main requirement was to mechanise wherever possible in order to reduce the operating manpower to a minimum. The plant is in fact operated by two men per shift with the usual maintenance by fitters and others generally employed for the purpose on the works.

Four 8½-ton Harris mechanical rotary spent oxide burners, each with independent feed, are installed in the spacious and airy furnace house. Spent oxide is delivered from the gasworks and dumped in a storage area adjacent to the plant, or alternatively brought direct to the receiving hopper in tipping wagons. Mechanical handling of the oxide from storage into the furnaces, and the residue from the furnaces into a concrete silo for eventual disposal by rail wagons received special attention and a system of conveyors and elevators is incorporated with a magnetic separator (for removal of tramp iron) situated over the intake conveyor, oxide crusher, feed controls, and weigh-in recording machine. The recording weighbridge affords a regular check on weight of oxide fed to the furnaces and so facilitates steady working of the plant. To eliminate nuisance from dust in the furnace house the furnace residue is discharged to a ribbon spiral conveyor built into the floor which carries it away to a totally enclosed elevator and up to the burnt spent oxide silo. During its long experience in acid manufacture and furnace operation the Gas Board has devised a very reliable spiral conveyor for dealing with furnace residue and the main features of its design are incorporated in this plant with pleasing results. Again to cope with the dust problem when discharging from the burnt spent oxide silo, a Babcock and Wilcox wetting mixer has been installed to damp down the oxide.



Mills Packard chambers

The electric passenger and goods lift which operates between ground level and tower house is an additional feature provided to assist the plant operator.

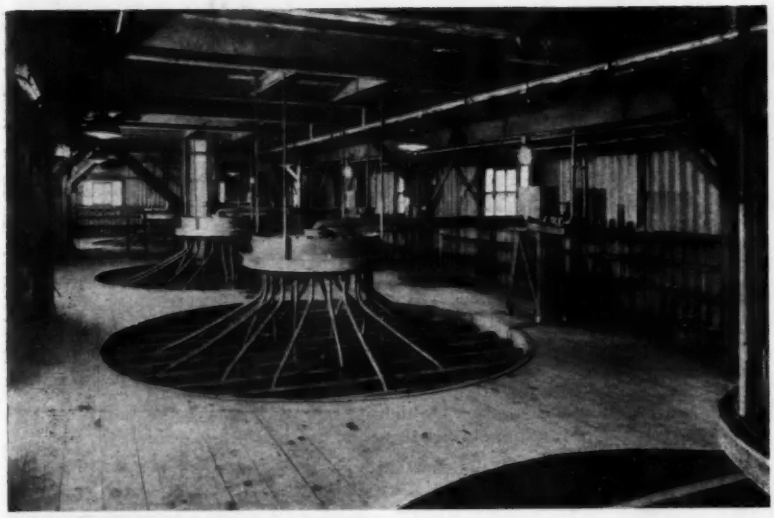
Careful attention has been given to the North Thames Gas Board safety standards, to general safety control of the plant, and elimination of risk of acid spillage. A unique system of acid circulation and pumping control is employed with absolute interchangeability between pumps and tanks, thereby catering for sudden breakdown in any one pump, tank, or acid main.

Structural material is in the main mild steel but a rather more liberal use has been made of reinforced concrete than is usual in acid plant construction. The chamber supporting platform is entirely reinforced concrete with a protective surface coat of acid resisting asphalt. Lead is used extensively and still found to be the most suitable material of construction for the main sections of the chamber acid plant. Although today's price of lead tends to keep up the initial plant cost, the high recovery value of the metal continues to make its use attractive.

Features of the Beckton Plant

Nitrous gases are provided by the ammonia oxidation process using 25% ammonia liquor brought to the plant from another section of the Board's Products Works. Three ammonia oxidation units are installed in one end of the furnace house, each with its independent thermostatically controlled gas-fired water heater. Under normal working conditions only one unit is in operation, the other two being available for use when starting-up and as stand-by. The nitrous gases enter the main flue and mix with the SO_2 gases from the furnaces just prior to entering the Glover tower.

The Glover is a sealed tower without the usual external dish and is built in one structure with the three Gay Lussac towers, under a common two-storey tower house. Like the Glover the Gay Lussacs are sealed at the base except for small acid outlets to the trough returns to the pump house. All tower tops are again sealed and kept dry, acid distribution being effected by using circular suspended distributors with multiple feed pipes welded to the tower ceilings. The circulating acid tanks situated on the top floor of the tower house are so interconnected and linked with the tanks in the pump house that unusual flexibility of control is possible. To meet the wishes of H.M. Alkali Department a water wash tower is installed between Gay Lussacs 2 and 3.



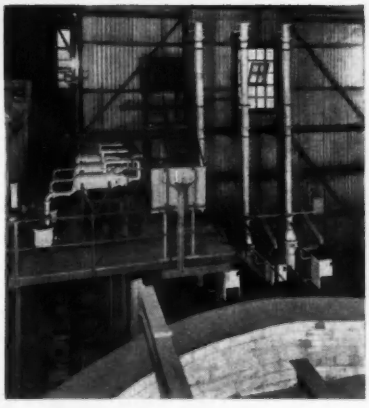
Interior of tower house

Mills Packard water cooled chambers are four in number, of the 'D' type design with a total capacity of 160,000 cu. ft. Sufficient chamber space was allowed on the assumption that the furnaces will burn more than their rated capacity—given suitable oxide. Increased output corresponding to a rate of working of 4 cu. ft. per pound of sulphur is possible, thus attaining the favourable low chamber space usual with this type of chamber. Improved techniques employed in construction and support of the lead have ensured perfect cooling water distribution over the whole chamber surface.

LaBour vertical packingless priming 'G' type acid pumps are mounted on acid resisting brick plinths in a roomy pump house, together with the spray and cooling water pumps. The floor of the pump house was built to a well-tried and proved North Thames Gas Board specification. It is laid with a slope to a covered drainage channel and constructed on a concrete bed with inter-sheet rubber lining and acid-resisting tile finish. A central control point is arranged with a system of troughs and plugs from which acids can be directed to various tanks in the pump house.

Instrument control and record of temperatures are afforded by the use of thermometers and thermocouples in various sections of the plant, and a gas analysis outfit linked to a recording instrument is installed for measuring the SO_2 gases before entering the Glover tower.

The finished 77% (140°Tw) acid passes through a battery of submerged coil coolers after leaving the Glover tower, then on through the pump house and high level tank in the tower house to the works storage tanks.



Ammonia oxidation plant

I.G.E. Residential Course on Management

COLONEL SIR HAROLD SMITH, Chairman of the Gas Council, in opening the first course of the Institution of Gas Engineers in management and general subjects at the Brooklands County Technical College of the Surrey County Council at Weybridge on June 8, particulars of which were published in the *Journal* of June 10 (p. 746), recalled that a little over two years ago he called the attention of the Council of the Institution to the increased responsibilities of divisional and group managers and suggested that an extension of the education scheme for professional gas engineers to include the subject of management was desirable.

The industry obviously could not be managed in detail by a few people stationed in London. Delegation was necessary. To learn how to delegate was one of the things which a manager must learn. The amount of responsibility which must be carried by any manager himself and the amount which he decided to delegate depended largely on the size of the undertaking, on the characteristics of the undertaking and the qualifications of the staff, but he assumed that those who were taking the course were being trained to be able at some time to manage an organisation sufficiently large to require a considerable degree of delegation of authority.

A professional background was of tremendous advantage to a manager, in fact, it was essential. An engineering training and background took a lot of beating, but he might be prejudiced. The more a manager's responsibility grew the less work he was likely to do in his own professional line. He became the leader of a team. While practising delegation he must keep himself informed as to what was going on in the various parts of the organisation. The more his responsibility grew the more he became the servant of his team, and, in fact, of all who were serving below him. He must cultivate the habit of thinking clearly what he wanted to achieve and he must be able to convey his ideas and wishes clearly to his subordinates. Enthusiasm and imagination were essential and a good memory was an enormous help in management.

Importance of Consultation

The more consultation that could take place before definite decisions were arrived at the better. So far as was appropriate consultations at quite low levels were of tremendous advantage: whether these consultations took place before decisions had been arrived at or after was a matter which a manager must decide for himself in the light of all the circumstances. Unless, however, everyone concerned knew what was going on he could hardly be expected to maintain the fullest interest in the operation planned and executed.

Loyalty was essential. There were four loyalties—to superiors, to colleagues, to juniors, and to oneself. The last was the most important of the lot. The secret of delegated management was the ability to choose the right men for their jobs and to encourage and help them to do them. A good manager could organise himself out of a job and then go away for a holiday feeling quite content that things would go on quite as well without him as with him.

Protests at the Scottish Gas Board's decision to impose a new minimum charge of 7s. 1d. per quarter on consumers in the town were made at a meeting of the Dalkeith Corporation. Councillors accused the Board of causing hardship to many old people who never used anything like 7s. 1d. worth of gas in a quarter. 'Throw the meter at them and get electricity in,' was the suggestion of Hon. Treasurer Moffat. Councillor Campbell said that the Gas Board had put forward the suggestion that this was a meter charge, but how could they put it down as a meter charge when they were not reading the meter? The regulator had to charge the consumers 7s. 1d. whether they consumed that value of gas or not. 'It seems strange,' he added, 'that when the Electricity Board has done away with a meter charge the Gas Board should come in with this new charge.'

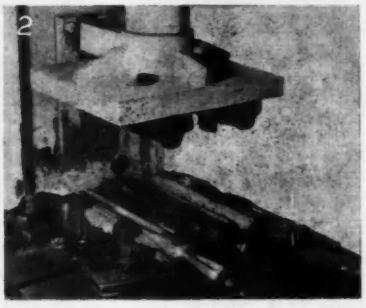
The manufacture of GAS FIRE RADIANTS

a pictorial account of the process of Radiation Ltd.

THE manufacture of refractory radiants for gas fires is being carried out as a continuous process at a Production Centre of Radiation Ltd. A brief outline of this process will be of interest to those who handle the finished article.

The raw materials consisting of specially selected clays and other ingredients are first thoroughly dry-mixed, water then being added to impart the necessary plasticity to the mass. Mechanical mixing tends to trap a certain amount of air in the mixture, which, if allowed to remain, would lower the strength of the finished product.

1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The plastic clay mass is therefore shredded and passed through a vacuum chamber which removes the air and is then extruded in the form of rods, round in section.—These 'wads' are of a form and size suited to the next process of moulding.

The clay wads are passed forward to the moulding section where they are forced into shape on the latest type quick-acting hydraulic presses, each of which is controlled to give an exact pressure. The mould, in which the clay is pressed, is in two halves and after the two sections of the radiant have been formed they are folded over, and securely joined, before being removed from the mould with specially designed lifters (fig. 3). At the side of each operative is a tray, shaped to receive the radiants as removed from the mould, and when filled it is placed on the slow moving conveyor (fig. 4) which takes the plastic radiants to the drying tunnels. Here careful handling is particularly necessary because the radiant in its soft condition

4

5

6

can be easily damaged. The trays of 'green' radiants, as they are called before burning, are carefully transferred on to rack cars which move slowly through the drying tunnels where the moisture is removed evenly and under controlled conditions.

At this stage the radiant though not pliable is still fragile, and the excess material left by the moulding process is carefully removed from the edges and the openings in the radiant pattern by operatives 'fettling' or cleaning each opening individually (fig. 5).

The next operation, after the fettled radiants have been put into 'saggars' which are refractory containers, is the 'burning.' Here the saggars of radiants are passed slowly through a tunnel kiln having graduated and controlled temperatures, even to the cooking time after 'burning.' Radiants come from the kiln white in colour, having the mechanical and refractory strength necessary in a high grade radiant and pass to the inspection and gauging department. Each radiant is then examined for flaws, the perfectly sound ones being ground to size and gauged to narrow limits. The final stage is packing, each radiant being individually cased in a corrugated sleeve before packing in bulk.

The closest attention is paid to all process detail, and the whole of the manufacture from the clay mass to the finished product is under laboratory control to ensure that radiants of a consistently high quality are produced.

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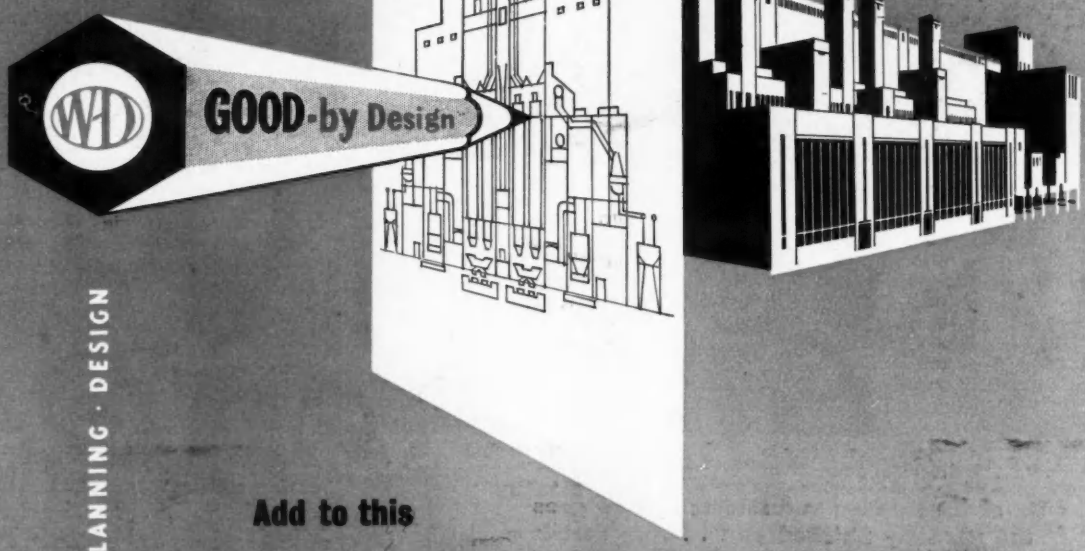

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Abstract of I.G.E. Communication No. 427

By NORMAN HUDSON, M.B.E., M.INST.GAS E.,
Chief Commercial Officer, North Eastern Gas Board.

The functional design of Gas and Coke Appliances

IN the past eight years, two reports have been issued by committees appointed by the Government to consider fuel matters—namely, the Simon Report and the Ridley Report. Although many in the gas industry disagree with some of their findings, the industry should not lose sight of the fact that both reports recommend that the basic load of domestic space heating and hot water supplies in new and reconditioned dwellings should be provided by solid-fuel-burning appliances, and that, in consequence, the manufacturers of this type of appliance are producing equipment of sound functional design, particularly so when using solid, smokeless fuels, to meet these requirements. Recent Governments, controlling as they do a very large percentage of the house building projects of the country, and having received these reports, have taken steps to see that these solid-fuel-burning appliances are installed to give these services.

Realism

If the gas industry is realistic, it will admit that the foregoing must result in:

(i) an extension of the opportunity for selling coke that is correctly graded in size and consistently of suitable quality, and of gas for igniting the same;
(ii) the relegation of gas to a supplementary rôle for space heating and hot water supplies;
(iii) an equal opportunity with other fuels for gas to obtain the basic cooking load unless the solid-fuel appliance installed for basic space heating and hot water supplies includes an oven unit, in which case gas may be also relegated to a supplementary rôle for cooking;
(iv) an equal opportunity with other fuels to obtain the basic home laundry load; and
(v) an equal opportunity with other fuels to obtain the basic refrigeration load.

There will, of course, be some cases—possibly the majority in a few particular districts where the quality of the service is the main consideration, and cost is only of secondary importance—when the foregoing will not apply, but such cases will be a small percentage of the total.

Again, the gas industry must recognise two facts:—

(i) That in the case of the really old out-dated dwellings, due for demolition as soon as circumstances permit, it is highly probable that the most either landlord or tenant will be prepared to do to improve the shortcomings of the domestic services during the remainder of the useful life of the buildings will be to fit capital equipment that can be installed at low cost; if they do do anything, this cost item will be the first consideration.
(ii) That in the case of the younger type of old house with say, two or more decades of useful occupancy before it, it is highly probable that some steps have been or will be taken by either landlord or tenant to improve the domestic services, and that the extent to which this will be done, and the reason for doing it will vary considerably. In some cases, it will be to supply a service previously non-existent, in which case 'fuel cost' is likely to be the chief consideration; in others, to supply a service supplementary to one already available, but which, on occasion, is inadequate or too costly or inconvenient, in which case the cost of equipment, installation and maintenance may be the deciding factor.

In both these cases, where the service in question is one dependent upon fuel, the gas industry will have to compete on equal terms with the other fuel supply services.

In the fields of space heating and hot water supplies the position of gas is not so secure, since the increased cost of all fuels has made the annual cost of the fuel used a much more important quantity in the all-in cost of the service than it used to be. Once again, if one is realistic, it must be recognised that, so far as these loads are concerned, the industry's future interest in them must depend upon its ability to reduce the cost of fuel to give a particular service. To increase the quantity of useful heat made available per therm of gas consumed would be one way of achieving this objective, and in this connection reference might be made to the part sulphur plays in this problem in the space heating field. If the industry could heat commercial buildings with gas-fired air heaters, using partial or whole circulation of the products of combustion and provide partial recirculation of once-heated air under controlled conditions of ventilation, there is little doubt that it could make appreciable headway in this field. Another way of achieving this objective would be to use within the one service the two fuels produced by the industry, namely, coke and gas—the former to be used for the daily base-load heat requirements of the service, the latter for the daily variations within which functional temperature control would be covered. Providing both fuels were to be used efficiently, the average cost per therm of fuel used could be substantially reduced, and, at therm of fuel used could be substantially reduced.

Dual-fuel Equipment

In connection with water heating, there is a further field of possible development that is worthy of comment. In the larger houses, small blocks of flats, and certain commercial establishments, a great drive was made by the industry, between the First and Second World Wars, to obtain the winter space heating load via gas-fired boilers specially designed for this purpose, and in many cases the same equipment provided general hot water needs via an indirect heat exchanger, such as a calorifier. To-day, in cases where little or no credit can be claimed for gas in reducing labout costs, and because of the need to adjust the charges made for gas to the true present-day costs, which has resulted in the withdrawal in many districts of promotional tariffs for this load, it is becoming increasingly difficult to hold certain sections of this business. Although the industry may lose this load for gas, the author believes it can be held and even developed for the industry if it be remembered that it is a two-fuel industry, and dual-fuel equipment is developed that will use a cheap coke therm to meet the mid-winter base-load needs and a relatively dear gas therm to supply the variable space heating requirements at the beginning and end of winter, and the general hot water requirements via a heat exchanger in the summer.

The appliance designers can quite rightly state that the industry can already do this by using two separate appliances, namely, both a coke and a gas fired boiler, and connecting them to the same water circuits; but will the consumer accept this? In some cases he may, but in the majority he will either make one boiler do or consider other methods that can give him the same supplementary service at a lower capital and installation cost than the gas industry can offer.

If it is felt that the industry would welcome such a consideration, knowing that the comparison would be to its advantage, nothing more need be said; but if the contrary should be the case, would its position be improved if it could offer one boiler capable of burning coke and/or gas at the discretion of the user, without the need to adjust controls, etc., when a fuel change occurred?

When the North Eastern Gas Board considered this question some time ago, it was felt that its position would be strengthened could it offer such an appliance; so the problem was passed to its Industrial Gas Development Section for examination. A list of qualities was agreed, which, it was held, should be provided in the design if it was to be functionally sound in its broadest sense—*i.e.*, both technically and commercially, as follows:—

(i) No limitation to use of fuel—*i.e.*, it must provide for coke alone, gas alone, and coke and gas together.

(ii) Gas to be automatically complementary with or supplementary to coke—*i.e.*, no need for the user to adjust controls when a change in the fuel used occurred.

(iii) Preservation within reasonable limits of present thermal efficiencies obtained for each fuel when used on single-fuel boilers.

(iv) Capital, installation and maintenance costs to be appropriate to the service given.

Hopes are held that the final design will be such that any one quality of it will be in such a relationship with each and every other as will allow each to make its appropriate contribution to the service for which it is being developed.

DISCUSSION

Mr. **Henry Jones**, M.B.E., Deputy Chairman, Gas Council, said there had in recent months been a falling-off in the sales of gas-using appliances, and he understood that more recently there had been some reduction in the number of solid fuel appliances which were being sold. The reduction in the rate of production of appliances gave an opportunity for the introduction of improvements and modifications which might be needed not only to increase thermal efficiency, which was, of course, most important from the point of view of the nation and of the gas industry, but to increase consumer satisfaction which, as Mr. Hudson pointed out, was not necessarily the same thing. The two outstanding virtues of gas appliances from the consumers' point of view were probably speed in action and flexibility. To sacrifice these qualities for a marginal increase in test bench efficiency would not please the consumer.

The Question of Tolerance

The author had referred to a genuine desire, dictated, no doubt, by both the need to obtain new business to replace the lighting load and to meet the keen competition by other fuels for other loads, to provide, in the years between the two world wars, a gas supply of reasonably constant composition, low in sulphur and gum-forming constituents and at adequate and constant pressure, and a well-graded coke of consistent sizing and quality. Appliances, whether gas or coke appliances, must in his (the speaker's) view provide a reasonable tolerance; in other words, they must give their rated efficient performance on a range of fuels which would give the man who produced those fuels a reasonable working margin within which he could vary his methods of manufacture to meet day-to-day requirements. But in his view it would be unfortunate if the paper were to be interpreted as saying that production engineers at the present time, whatever they thought prewar, were content to supply any quality of gas and any quality of coke that might be most convenient to them without regard to the requirements of the consumers or of the appliances. No doubt those more concerned directly than he was at the moment with gas production might have something to say on that point.

He would also like to mention, as Mr. Hudson did in presenting the paper, that the memorandum with which his name was connected, and which was referred to in the last paragraph of the paper, was not in a form suitable for publication; it was in the nature of a committee paper which was being studied, but it had not appeared publicly, and mention of that fact might save questions in the discussion.

When considering the sulphur content of gas, the author referred to the use of gas containing up to 10 grains of sulphur per 100 cu.ft. being burned fluelessly at a rate of 1 cu.ft. per 100 cu.ft. of room volume per hour. When discussing non-domestic space heating, he referred to condensation difficulties. Would he agree that caution must be exercised when using flueless heaters, even in private dwellings? If the rate of air change was restricted, might not condensation be as great a limitation as was the sulphur content of the gas?

The shale content of coke gave rise to difficulty, more especially when selling coke for the open grate. Mr. Hudson made suggestions about removing the shale from the coal or coke at the gasworks. Had he any figures of the cost? The impression among many of them was that that could be a very costly matter indeed at the gasworks. Some of them thought that that shale might well be removed elsewhere. But if Mr. Hudson could show that it could be done at the gasworks at an economic cost, he was sure it would be of the greatest interest to everybody.

Coke for Base Load Heat

The author had suggested that coke should be used for the daily base load heat requirements of commercial space heating with gas to meet the daily variations arising from atmospheric temperature. Would he not agree that, theoretically, the fuel which could most easily be stored for seasonal use—coke—should meet the peak fluctuations, while the fuel which required heavy capital investment to produce it at a given daily rate should be given the longest possible heating season if it was to be used for space heating? Logically, this would mean space heating by gas when external temperatures were at or above a given figure, supplemented by coke when temperatures were lower. Alternatively, would it not be desirable to install gas heating equipment adequate for autumn and spring use or during times when the outside temperature was above a given level, leaving the main space heating to be taken wholly by coke during the colder part of the winter season?

Mr. Hudson had suggested that the domestic cooker should be provided with a hot closet. Certainly, however well food might be cooked, it was no pleasure to eat it off cold plates served out of tepid dishes. Hot closets had been made available in the past, but the public demand for them had not apparently warranted their extensive production. Was not the difficulty partly met by the use of an oven in which the heat was lower at the bottom so that plates could be warmed on the floor of the oven while cooking was proceeding in the upper part?

Burner Ignition

Under the heading of 'Burner Ignition,' Mr. Hudson was voicing an opinion which seemed to be almost universally held within the gas industry and by many consumers. Automatic ignition, not only of cookers but of gas fires, in his view, fell far short of what was necessary. This equipment should work for a much longer time without maintenance and should be much simpler to maintain and, in the case of some gas fires, much more accessible.

Turning to coke, it was an unfortunate fact that many householders who had in their homes modern grates well suited for the use of coke preferred to use coal. This was due to a variety of causes. They might feel that a scuttleful of coke did not last so long as a scuttleful of coal, failing to realise the different density of the two materials. There was among the public a fairly widely held view that coke was coal with the goodness taken out. They in the gas industry had not been nearly successful enough so far in making the public realise that coke was a fuel upon the preparation of which much money was spent and for the manufacture of one ton of which two tons of coal were required. Another point was that most people seemed to keep a small smouldering fire in their modern grate and, for this purpose, small coal would stay alight for long periods, albeit burning with considerable smoke. When using coke it was possible that the amount of heat given off by the fire was often more than the consumer needed, and he might not be sufficiently instructed as to the control of combustion at low rates.

It seemed likely that, if the use of coke in houses was to be developed to the full, two sorts of coke would have to be offered to the public, one which could be guaranteed to give effective service in the open grate, and the other which could be relied upon for use in domestic boilers. In some places the two cokes might be identical, except for size. In other places, some segregation might be necessary, having regard to the source of the coal used in the manufacture of the coke. This was not a new idea. It was carried out before the war in some areas, sales of open fire coke being built-up on that basis. But it was not being pursued much today.

(*Continued on p.* 801)

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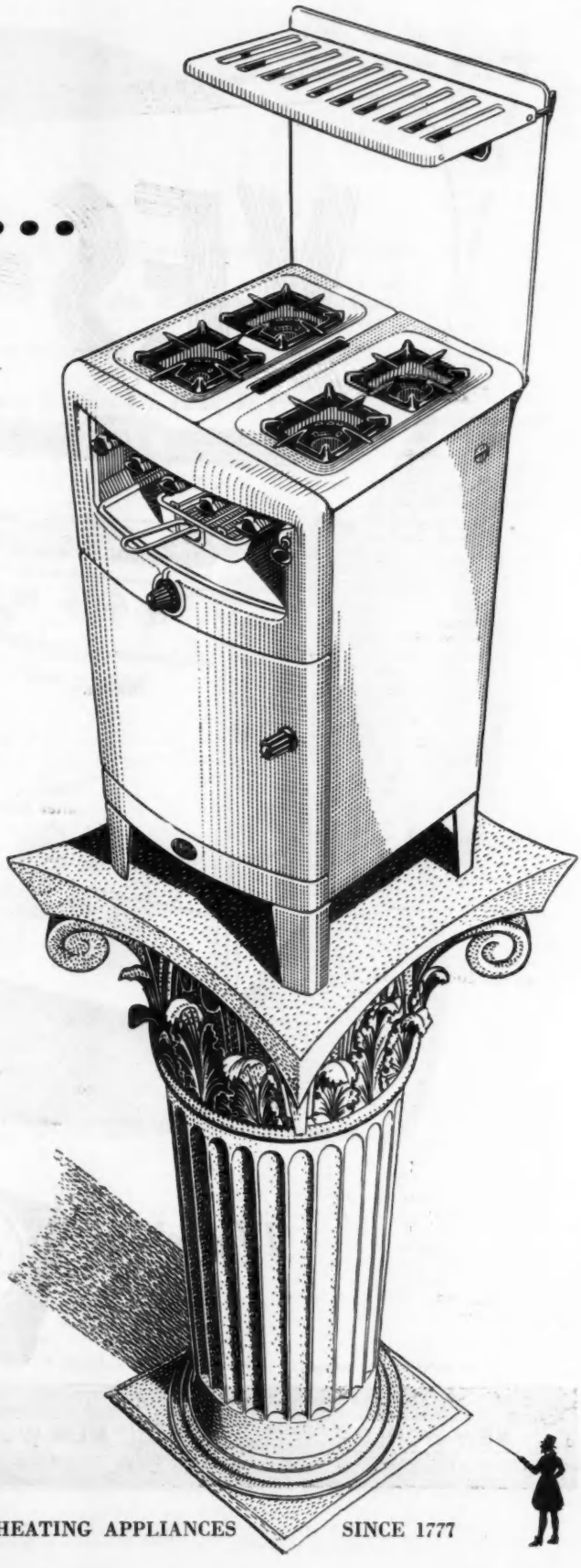

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HOW SEAWATER MAKES MAGNESIA IN HARTLEPOOL

Unique Plant uses Goodyear Belts to keep running costs down

To the north of Hartlepool, Co. Durham, magnesia—the vital raw material for refractories—is being made from seawater and dolomite. Here, a plant operated by the Steetley Magnesite Company, Ltd., is producing 50,000 tons of magnesia every year.

After undergoing various processes, the seawater is mixed with dolime. The resulting magnesium hydroxide precipitate is fed to tanks where the sludge is mechanically raked off. This sludge is dried in rotary kilns and the magnesium oxide residue dropped into a cooler before being packed for dispatch.

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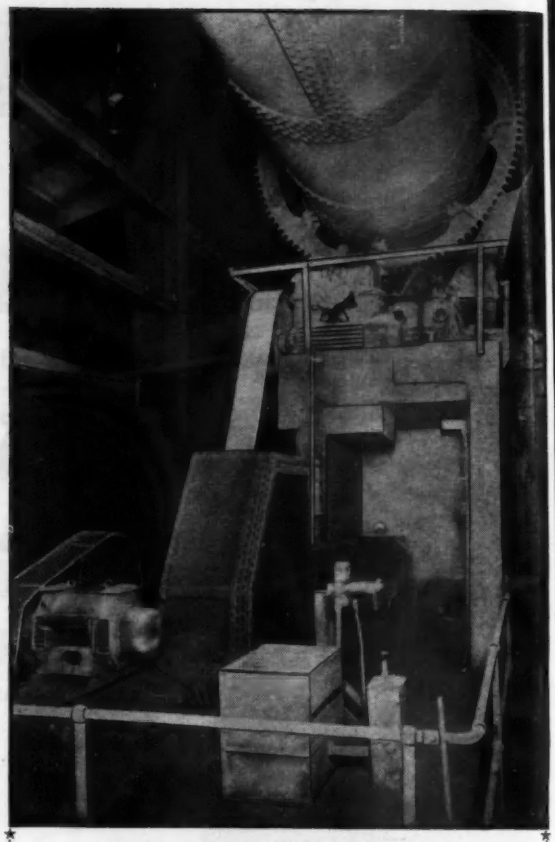

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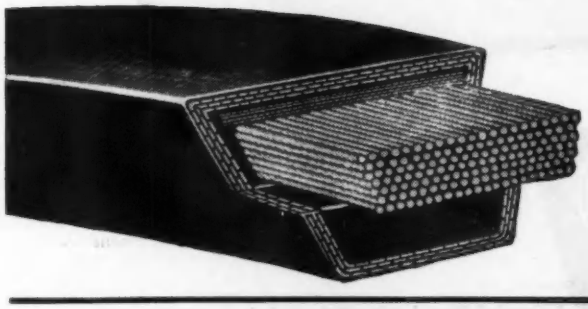

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GOODYEAR

INDUSTRIAL RUBBER PRODUCTS

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In the design of small coke boilers, there was still room for improvement. Dr. Mott had recently presented a paper setting out the results of experimental work. Those who had used boilers with thermostatic control on the air inlet would know what an enormous benefit this conferred upon the user of the boiler in comparison with the hit and miss methods of setting the air inlet. For the cheapest type of boiler a thermostat might not be necessary, but in its absence there should be some device to control the draught on the boiler flue and to prevent excessive draught building up as the temperature of the flue gases rose, and an air-tight ash pit which should be provided with a two-position air intake, one suitable for banking and one for normal use during periods when hot water was likely to be required.

The dual-fuel boiler under development by the North Eastern Gas Board was certainly ingenious, and one hoped that it would be developed to a point at which it would give the consumer complete satisfaction. Would Mr. Hudson agree that it might give better service if the gas flue were brought out with a suitable draught break and introduced into the main flue above the damper? This would enable the damper to be completely closed when burning gas only and would avoid some loss of heat through air circulation when the consumer did not wish to use coke.

The Manufacturer's Viewpoint

Mr. **W. D. King**, M.C. (Deputy Chairman and Technical Director, Radiation Ltd.) remarked that the subject of the paper was naturally one of particular interest to those responsible for the design and manufacture of gas and coke appliances. He thought it would be granted that in the last quarter of a century tremendous strides had been made in the functional design of gas appliances. It was, however, very easy to over-simplify the functional issues, and a realistic approach must take fully into account the diversity of conditions to be met, particularly in household appliances. In many respects functional requirements could only be defined on a statistical basis, and Mr. Hudson's definition of 'function' seemed to him to take an unduly narrow view of the subject. Mathematically, when they said that A was a function of B they implied that for any chosen value of B there was an ascertainable value of A. In dealing with such matters as personal comfort, palatability of food, or standards of hot water supply in the household, the variability of human requirements was such that methods of operational research had to be applied to obtain a sensible answer, and even then the conditions of the enquiry had to be very carefully thought out beforehand, otherwise the answers obtained might be misleading. Even when the objective was capable of clear definition, its implications from the point of view of appliance design might be extremely difficult to follow through to their logical conclusion. Appliance design involved a compromise between technical, æsthetic, constructional, functional, and cost factors, and the correct balance between these was a matter that called for very delicate judgment.

Let them take, for example, the question of safety devices on water heaters. Under normal conditions of operation such devices were never called into play. Apart from the effect of initial cost, the fact that the introduction of a safety device into an appliance could have repercussions on other aspects of design led to the conclusion that, in the great majority of cases, there was no functional justification for the device. Water heater design had, however, been very largely conditioned by the need to cater for abnormal rather than normal usage, and the question arose as to how far it was justifiable to affect adversely the cost, and possibly the overall performance, of all appliances by the inclusion of expensive complicated accessories which were truly functional only in a small minority of cases.

Expediency

It frequently happened also that functional design was overridden by matters of expediency and commercial practicability. The recent Home Office Regulations relating to fireguards applied only to gas and electric appliances, while leaving the situation in regard to solid fuel appliances unchanged, in spite of the fact that the hazards were comparable in all cases and numerically the greater number of accidents and fatalities that actually occurred were attributable to coal fires. Insistence on a functional approach in this case was presumably believed in official circles to be likely to result in an undue amount of opposition from the public in spite of the fact that it was in the public interest.

The need for compromise in the functional approach to gas appliance design was nowhere more manifest than in the case of the gas cooker. He found Mr. Hudson's suggestions under this heading a little disappointing, in that ease of cleaning and simplicity in operation tended to be diametrically opposed to the introduction of automatic ignition in a form ensuring absolute reliability.

Turning again to Mr. Hudson's approach to water supply, he felt that the comparison of the circulator and the back boiler unit was far from convincing, because the underlying assumption of equal heat loss rate in the two cases was not valid. It was only when the gas circulator had been incorrectly installed that circulation of hot water through the whole system occurred; and as a substantial proportion of the heat loss took place from the usually fairly lengthy circuit between the solid fuel boiler and the storage cylinder, the attainable efficiency in the case of the circulator was considerably higher than was indicated by the comparison.

Further, it was not clear why in the example quoted a circulator of 5,960 B.Th.U. per hour rating was chosen for comparison with a back boiler unit of 19,730 B.Th.U. per hour. A more logical comparison would have been to take a circulator of more equivalent rating. Were a circulator of 14,000 B.Th.U. substituted, even on the basis of Mr. Hudson's heat loss figures, the practical efficiency of the circulator would be brought up to over 60%, and when allowance was made for the difference in heat losses from the two systems previously referred to, it would be reasonable to suggest that a figure of at least 65% would be attainable under the conditions in which the back boiler unit was giving only 44%. In addition, the use of an economy valve in conjunction with the circulator could further increase the attainable efficiency, given intelligent use.

He read with particular interest the section of the paper dealing with the combined gas and coke boiler, as a very similar appliance was developed by his organisation during the war period, being covered by Patent Specification 568,416 completed in April, 1945. He believed that others in the industry had also thought along similar lines, and while the appliance had a number of technical attractions the existing situation in regard to purchase tax prevented it from being a commercial proposition. As with other combined gas and solid fuel appliances, the whole appliance would carry purchase tax at the full rate appropriate to the gas water heating appliances, and the cost would be prohibitive. The approach to this matter must, therefore, depend on whether they had to lay their plans on the assumption that purchase tax anomalies would always be with them.

In regard to space heating, Mr. Hudson rightly emphasised the importance of considering both the appliance and the fuel and recognised that the current tendency to insist that the appliance must be designed to meet widely varying conditions of supply constituted serious limitation on the competitive position *vis-à-vis* the other fuels. The increased possibilities of flueless heating which would be opened up by a reduction in sulphur content had, of course, been before the industry for many years, and it was felt that the appliance designer could contribute little in this field until the problem of sulphur had been successfully tackled.

Force of Tradition

As to the functional design of flued gas space heating appliances, it would be evident that the force of tradition had very seriously hampered development in this direction. The open coal fire with its conventional tiled surround had not only wasted their basic fuel and polluted their atmosphere, but had also dominated the development of the gas fire which, in its generally accepted form, was functionally a makeshift—a temporary conversion become permanent, inferior in a number of respects to what it might have been had the economics of heating in Great Britain allowed it to develop in its own right. If gas space heating was to take the place in their fuel economy that its convenience and fuel conservation characteristics warranted, it must free itself from its thraldom to the open coal fire and establish its own functional forms appropriate to its various uses in the home.

It was apparent that in recent months there had been a revival of interest in space heating in the gas industry, but if effective progress was to be made, limitations which had been accepted in the past must be abandoned. An essential part of an imaginative approach to this problem was reconsideration of tariffs, a functional approach to which could very easily transform the situation. By the encouragement of a balanced winter space heating and summer water heating load, the industry could make a real contribution to an efficient and hygienic use of the nation's fuel resources without allowing the load factor bogey to raise its head.

Mr. **W. G. Phillips** (Eastern Gas Board) commented that the author stated that it had been generally accepted that a high sulphur content in town gas was a disadvantage in two particular respects: (1) It restricted the development of the space heating load by flueless appliances; (2) it increased the initial

and maintenance costs of certain appliances. He would like to add a third impediment and one which the Committee of Enquiry on Sulphur Removal set up by the Institution referred to in its Report in 1942—namely, the adverse influence on the prestige of the industry.

As an example of this third impediment, only recently in the course of conversation with an official of a county authority who had a very large school building programme in the Watford Division, he asked her why it seemed that gas water heaters did not appear to be in favour. The answer of this lady, who was by no means prejudiced against gas, was: 'Oh, you know the general impression one has of gas water heaters is that a nasty green trickle and stain is left on the basin or floor over which the heater is fixed, and there is the accumulation of green fluffy stuff under the heater if a tray is provided to catch it.' Unfortunately, they knew that in all too many cases such a remark was justified, and the harm to their cause could not be assessed in terms of pounds, shillings, and pence.

The Arch Corroder

Sulphur was the arch-corroder, and the author had referred to the maintenance costs of instantaneous water heaters and reminded them of the work carried out by Booth and Davidge of the former Gas Research Board and Fuidge of the former South Metropolitan Gas Company on the corrosion of water heaters, which showed that within a range of sulphur content of gas from 17 to 3 grains per 100 cu.ft. there was almost a proportionate reduction in corrosion. The author asked whether an appliance designer could improve on the design of a water heater if the sulphur content were around 10 grains instead of 20 to 30 grains per 100 cu.ft. He would refer them to the recent Gas Sales and Service Conference when Mr. George Ewart, speaking on 'A Manufacturer's View,' stated: 'Manufacturers' attention will be directed in the immediate future to reducing the first cost of the appliance and subsequent maintenance costs by the introduction of new methods of construction and materials. Considerable progress has already been made in this connection and would be greatly assisted if the gas industry could supply gas of a lower sulphur content and with less gum.'

The author referred to the restriction on the development of the space heating load by flueless appliances, and further on in the paper mentioned the domestic background space heating load. The gas industry was badly in need of domestic loads, additional to the cooker, to arrest and reverse the present trend for the annual consumption per consumer to fall. Gas for use as a supplementary fuel to solid fuel for water heating as outlined in the paper offered the greatest potential; to a lesser extent, gas for long period background heating in halls and buildings and for heating the living room during the periods when it was not worth while to light the grate.

Although it was well known in many quarters, it should be mentioned that sulphur in town gas when used for certain industrial process work was extremely undesirable. As examples in the metallurgical industries, the scaling of great importance, which must be sulphur dioxide; low sulphur gas was required for bright annealing; sulphur could cause embrittlement of metal; in providing furnace atmospheres it was essential that the gas should have a low sulphur content.

He had referred to the Institution's Sub-Committee's Report of 1942 on Sulphur Removal, which recommended a reduction down to 10 grains per 100 cu.ft. as a first step, with 3 grains as an ultimate aim. The British Gas Federation's Post-War Planning Committee subsequently strongly endorsed those recommendations, and urged that, failing voluntary compliance within a certain time, a suitable authority be empowered to insist on their implementation by all gas undertakings.

He asked whether the industry was not handicapping itself in its sales efforts by not facing up to this requirement. It was said, on the one hand, that this process was too expensive, and, on the other hand, that materials had been so scarce that all the steel and so forth that had been allocated to the gas industry for works plant should be used for essential production and purification plant. So far as materials were concerned, were there not signs of easement in this direction, and as to economics, should not a serious endeavour be made to assess the gain that would accrue both to the industry and to the appliance manufacturer? Was it out of the realms of possibility to suggest that it was possible for further work to be undertaken to cheapen the known processes of sulphur removal or to devise new ones?

Use of Electricity

Secondly, he came to the section of the paper on cooking, where comment was made on three particular qualities —provision of hot closet, enamel, and burner ignition. In regard to the third quality, he would like to ask the author whether he considered that the use of electricity for burner ignition should be extended, as advocated in the industry's Productivity Team's Report, and that generally there should be a trend towards the inclusion of more gadgets on a cooker, such as a timing device incorporated above the hotplate, an oven light operating on door opening, etc. These atuomatic aids would not only lighten the housewife's labour, but would have a modern appeal and prestige value.

He supported the author in his championing of the back boiler conversion unit, which seemed to have a very bright future and to fulfil a definite need at a low capital and running cost. There was one disadvantage attached to the use of this unit, the extent of which could only be shown by experience, and that was that the unit had to be placed in the grate and probably left there during the summer and removed and place elsewhere, possibly where it could be damaged, during the use of solid fuel in the grate in the winter. He suggested that the author should consider the principle of fixed dual fuel equipment which he had used for his prototype boiler applied to the domestic grate with back boiler and summer gas attachment.

The industry's future prospects depended on its being able to offer coke and breeze burning equipment of as sound design as the equipment for competitive fuels. It was a matter of serious consequence to the industry that very little new business of that type of steadily developing load in the 1930's was being obtained today. There were two reasons for our failure: price, and the non-availability of proved equipment to burn coke with automatic control and without use of labour for stoking.

Mr. G. C. Holliday (Manager, Watson House) said that the author's general lines of argument (1) that the gas industry must produce appliances which would give services preferred by the user to those given by other fuels, and (2) that the consumer was not particularly interested in gas and coke as such, but in the service given, were accepted by all of them. He would like to feel that the realistic approach to these problems by technical people, particularly in recent years, was recognised, if only because of the extensive studies of individual and combined heat services and the practical determinations of useful efficiencies.

Commercial Application

He knew of no aspect of their varied technical work which had not some commercial implications. To secure complete and speedy unanimity of commercial and technical views, it was, in his opinion, essential for both sides to meet as often as possible to discuss implications of new trends, to see new designs of appliances and prototypes and to review existing ones, and to consider the bearing of these discussions on programmes of technical development work. Such discussions, regarded for many years as essential by the Gas Light and Coke Company and the North Thames Board, had always been held, he might mention, without any suggestion of dictatorship on either side, and had been invaluable to the development laboratories.

Whatever the pattern of any co-operative working of this kind might be in the future, in fact, similar facilities for 12 board joint commercial and technical discussion with senior laboratory development personnel present had for some time been available through the Watson House Centre with, he was convinced, beneficial results.

In regard to gas quality, changes were generaly met in a simple and inexpensive maner by the use of different injector sizes or burners to suit the various specific gravity groups, recent clarification of which with the Society of British Gas Industries had been most valuable to the industry. A more detailed survey of gas quality throughout the country was at present being made.

In regard to sulphur, whatever potential changes in design a reduction in sulphur would allow—and there might be none in some cases—the most important immediate effect would be in reducing maintenance cost and extending the use of flueless appliances.

As to cooking, to maintain and improve their present position ease of cleaning was one important factor; acid-resisting enamel had proved to be essential from this point of view. The introduction of titanium oxide enamels had made possible a light finish which was acid-resistant without sacrificing any of the other qualities, such as adhesion and resistance to thermal shock.

The author quoted practical efficiencies with regard to hot water. While these were useful to the technician, the more realistic position from the competitive point of view was revealed if these were expressed as therms per week for a specified hot water service. In regard to catering appliances, it was agreed that the gas consumption obtained per hundred pounds of equipment price was much greater for catering equipment than for domestic equipment, and thus a high efficiency was

(*Continued on p.* 807)

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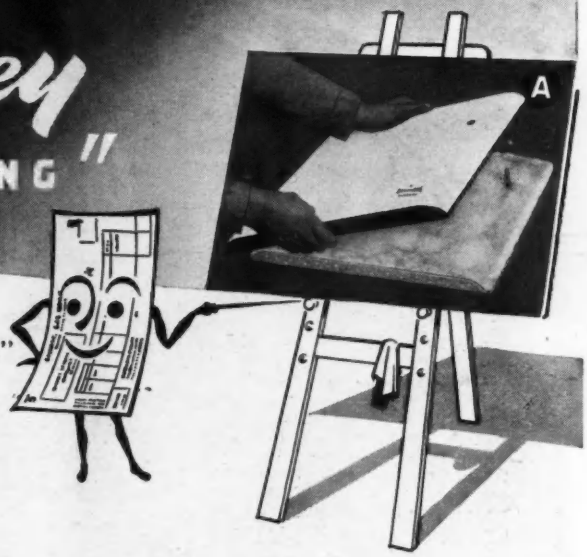

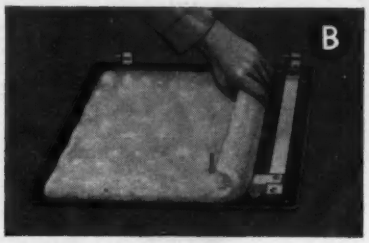

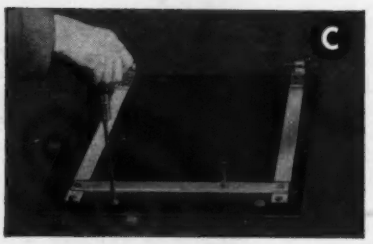

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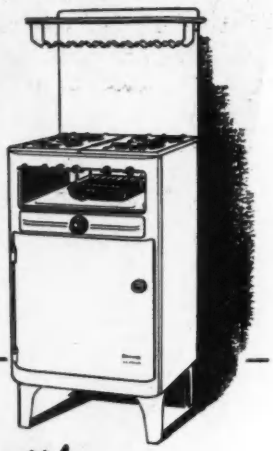

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of great importance, which must be obtained without sacrificing speed of boiling, flexibility, and so on. While progress in the design of catering equipment could not keep pace with domestic equipment owing to the smaller turnover, the new British Standard for Catering Equipment set down minimum requirements for various types of appliances which represented a substantial improvement on the pre-war position.

Efficiency and Convenience

Dr. **F. J. Eaton** (Coke Development Officer, North Thames Gas Board) said their approach to coke appliance design had always been that advocated by Mr. Hudson—namely, the desire to develop a particular load, and in the design to pay special attention to improved efficiency and convenience of operation. He would, however, like Mr. Hudson's views on the need for the 'all-fuel' rather than the 'coke-only' appliance. With the open-fire type of appliance their aim had been to make it suitable and efficient with all solid fuels, and it usually happened to give its best performance on coke. In justification of this policy it might be stated that all appliances approved by the Ministry of Fuel and Power for local government housing had to pass the specified tests on both coal and coke, and the performance standards required for coke were higher than those for coal.

The ability to burn alternative solid fuels, however, raised considerable problems in commercial development and market control. To illustrate this point, he would deal briefly with the development of the open-fire market. Starting with the Metro coke grate about 1928, this type of appliance was by 1933 selling at the rate of about 50,000 per annum. Then came the Fulham grate, also developed within the gas industry. This was the first of the modern combustion controlled fires of which there were some 80-odd different makes and of which some 2¼ mill. were sold last year. Of this business the gas industry possibly had not more than 10%. Further, although a market survey carried out in 1939 proved the public demand for gas ignition, not more than 10% of the fires now sold had this fitment. Here they had what Mr. Hudson called a functional design feature apparently in a very short time passing out of favour. He believed there was a demand for the gas ignition burner, but it was obvious that they would have to fight hard to recover this business.

Mr. Hudson had dealt at some length with the difficulties of the coke appliance designer in regard to shale. Personally, he would have chosen as examples the continuous burning rather than the intermittently operated open fire, for although named and advertised as continuous burning, their experience was that a very small percentage was kept alight continuously. For boilers of various types which were continuous burning there were now a number of satisfactory shaking grates. For large central heating boilers the Dutch had developed for the EMMA boiler (recently described in the *Fuel Economist*) a most efficient clinker removing ram mechanism operated simply by turning a wheel. For open fires, he would have thought the main difficulty was flying shale, a subject now under active consideration. Flying shale complaints had now apparently reached proportions which called for immediate action, and the problem had been given first priority. It would be best to remove the shale entirely from the coke, and this was done at some works. It was a costly procedure, and it might be that Mr. Hudson's suggestion of crushing the coal prior to carbonisation to below ¼ in. mesh would be a cure.

They believed that combined coke and gas appliances provided the cheapest domestic heat service. Like Mr. Hudson, in their case one of the four they had designed was a combined coke and gas boiler Patent No. 587,662/1947. This was fully developed technically, but was not proceeded with for the following two main reasons: (1) purchase tax had to be paid on the full price of the appliance. This in their view made it non-competitive with two separate appliances; (2) a restricted flow was desirable for gas firing to provide good stratification but undesirable with solid fuel on account of the increased risk of over-heating and scale formation. Thus one of the main advantages of gas firing was lost.

They had felt it to be a better commercial proposition to proceed with the Fulham finned back boiler and the B.B. unit, both bulk hot water heaters. Such appliances were used with open fires now recommended for installation in local government housing where at present few, if any, domestic boilers were being installed.

The Industrial Load

Mr. A. Higgs (Industrial Engineer, North Eastern Gas Board) said that in the North Eastern area they had not so far experienced substantial losses of existing load in the industrial field, the most marked effect of increased prices being apparent in a very steep reduction in the rate of increase of industrial gas sales. The business added during the current year—*i.e.*, to March, 1953—in the industrial and commercial fields was only approximately 25% of that added in the preceding year. It must, of course, also be remembered that industrialists could not change fuels easily or light-heartedly. They required at least for some of the more exacting processes, first to satisfy themselves that the alternative fuel was equally capable of fulfilling their requirements. Further, on plant involving high capital outlay to change over, the higher running costs were often tolerated until such time as major repairs or plant renewals became necessary. Thus, the present position in regard to loss of load might not be truly indicative of the ultimate position.

At the recent Industrial Gas Conference, held in Birmingham, it was evident that the considered opinion was that nothing revolutionary in the way of new combustion techniques or heat recovery devices capable of general applicability to industrial gas equipment could be expected, and that therefore competition would best be met by ensuring that they were giving a really first-class technical and practical service. This would ensure that existing gas-heated plant was operated at maximum efficiency and minimised inroads from other fuels on that score, and if such action was coupled with diligent attention to, and development work in connection with, the needs of industrial process plant locally, it would provide the best counter they could offer.

While industrial organisations varied in detail and strength in the various area boards, one sensed at the conference a general feeling that their forces in the field were not as adequate as might be desired, and he would suggest that more investment in staff and facilities concerned with industrial gas generally would pay substantial dividends.

Adverting to the North Eastern area, their major loss in loads had been in the commercial field, particularly for central and space heating. After ensuring that existing plants were efficient, there appeared little that the industrial gas engineer could do. The loads were being lost purely on economic grounds.

It was encouraging to note that certain area boards were offering concessionary tariffs to central heating and certain other industrial and commercial users, and with every respect for the argument concerned with the cost of peak load gas, the central and space heating loads were substantial, and had taken many years effort to build up. Such loads would not easily be recovered once they had changed over to other fuels.

While, probably in common with other boards, they were using every endeavour where loss of load was imminent to influence the use of coke as the substitute fuel, his opinion is that in less than two years time they would be taking positive action to regain and extend this load for gas, and therefore, if tariff concessions were possible at all, they should have serious consideration now.

On the question of coke substitution, in the case of one large school they had successfully applied a B.C.U.R.A. down-jet coke burner to an existing Ideal gas-fired boiler, and by this means they had retained the major load for coke, with a second gas-fired boiler to give automatic control cutting in and out when called on by thermostat. If this action had not been taken—and technically the application had proved very sound—the local authorities concerned would have replaced these fairly new gas-fired boilers, and the choice would undoubtedly have been coal firing with automatic stokers. There were many similar cases, and they hoped that their success in this instance would have due influence with local authorities and other large concerns contemplating changing over to a cheaper medium or even considering new installations.

A Two-fuel Boiler

Mr. Hudson had referred to a two-fuel boiler. He believed that such a unit would have great appeal, particularly to the commercial establishment and in the larger private residence. Such units could provide a fully automatic heating service on gas by the usual control methods when the premises were unoccupied and yet allow the major part of the load to be taken on coke when labour was available. They looked forward to such units being on the market, as they would undoubtedly assist in the general sales effort.

The industry required to take a more positive action if it wished to extend the use of coke in the domestic fire. One of the main problems acting against sales was that of storage. Most housewives were reticent to dispense entirely with coal firing and, the usual storage facilities being occupied by this fuel, the coke was stored behind the garage, the greenhouse, or some other out-of-the-way place where it became wet and contaminated with foreign matter which was not conducive to its giving a good performance. Further, and probably more important, it was usually required in bad weather, which influenced the housewife

(*Concluded on p.* 812)

Gas Industry Productivity

Team Members Compare British and American Practice

The report of the Gas Industry Productivity Team's visit to America was discussed at a meeting of the London and Southern Junior Gas Association at the North Thames Gas Board offices at Edgware Road, on May 29 under the Presidency of Mr. C. D. Shann. The report was introduced by two members of the team, Mr. J. A. Hepworth, Deputy Chief Engineer, North Thames Gas Board, who dealt with the engineering aspects, and Mr. L. F. Randall, Manager of the Special Service Section of the South Eastern Gas Board, who dealt with the utilisation side.

MR. HEPWORTH said the team was the 62nd of some 64 teams that had studied American industry with the primary purpose of giving opportunity to British industry to re-establish itself after the war and to learn something which might help them to increase their productivity and improve the economic condition of the country.

So far as the background of the American gas industry was concerned it was generally similar to the British gas industry prior to nationalisation. There had been much amalgamation of small undertakings and there were now many very big units, one of which, in terms of gas output, was about five times the size of the North Thames Gas Board. On the economic side, whereas the severely increased costs of coal, etc., had necessitated an increase of at least 50% in the price of gas in Britain since 1939, in America due to the increasing supplies of natural gas the corresponding overall price increment was only about 5%. Annual sales were about 48,000 mill. therms against our 2,700 mill. or about 18 times greater, while the population of the States was about three times that of Great Britain. In the last 20 years American gas consumption had increased four or five fold whereas the British figure had about doubled—a fact of which there was no need to be ashamed in the circumstances that had prevailed during the war years. So far as coal gas and water gas production were concerned these represented only about 5% of the total American output, and against our own 27 mill. tons per annum they carbonised something less than 5 mill. tons. Natural gas was plentiful and was obtained from underground gas fields or wells of varying depth, and it was generally constant in composition.

Vast Networks

There were about 65,000 gas wells in the States. As most of the natural gas was found in the southern states it was not surprising to find a very extensive natural gas network system. There were about 150,000 miles of natural gas mains network, and some of the individual trunk mains were very long. New York, for example, was supplied from Texas over a distance of nearly 2,000 miles with a pressure at the source of 800 lb. per sq. in. and with about 20 intermediate pumping stations en route.

Gas storage was an important problem and the Americans were developing underground storage. It was said that about 100 depleted gas wells were now used to store gas to the extent of 5,000 mill. therms. The effect of plentiful supplies of natural gas on the economics of the American gas industry has been tremendous. Without natural gas the position of the gas industry as a competitive fuel industry would undoubtedly have been very much less favourable than it is today. The cost of natural gas to the receiving companies, bearing in mind that its calorific value was around 1,000 B.Th.U. was about 2¼d. per therm.

Another substantial development in recent years was the use of liquefied petroleum gases, either butane or propane. This gas although relatively expensive was used by many companies as a supplement to natural gas and manufactured gas to meet peak load gas consumptions.

Gas undertakings, generally, were using increasing quantities of natural gas and the calorific value of distributed gas varied between 530 and 1,000 B.Th.U. according to the proportion of natural gas being absorbed. Ultimately it could be expected that within a few years the majority of companies would be distributing primarily natural gas at 1,000 B.Th.U. and that the only manufactured gas available for peak load or emergency conditions would be oil gas of 1,000 B.Th.U. Those companies distributing gas of 530 to 900 B.Th.U. usually employed varying mixtures of manufactured gases, natural gas, L.P. gas, etc., and their works became primarily almost gas mixing stations, where a study of the interchangeability of gases represented an important feature of operations in order to ensure a final gas of satisfactory calorific value, gravity, and flame characteristics.

The carbonising of coal in the gas industry was becoming insignificant. At present all the coal gas made was manufactured in coke ovens. There were about 12 installations of coke ovens owned by gas utilities, but it was expected that by the end of 1952, due to further exploitation of natural gas, the number would be reduced to about five.

The team had the opportunity, however, of examining a number of coke oven installations including some associated with steel works.

Choice of Coal

All coke oven operation in America was directed primarily towards obtaining a suitable coke of high and consistent quality chiefly for blast furnaces and foundries. Gas was a secondary product.

Gas companies have a much greater facility than in this country for selecting the coal they will use and confine their selection to a very small range of coals. By blending they obtain a consistent quality of feed to the ovens and thereby ensure consistent coke quality and contribute to the efficient operation and long life of the ovens.

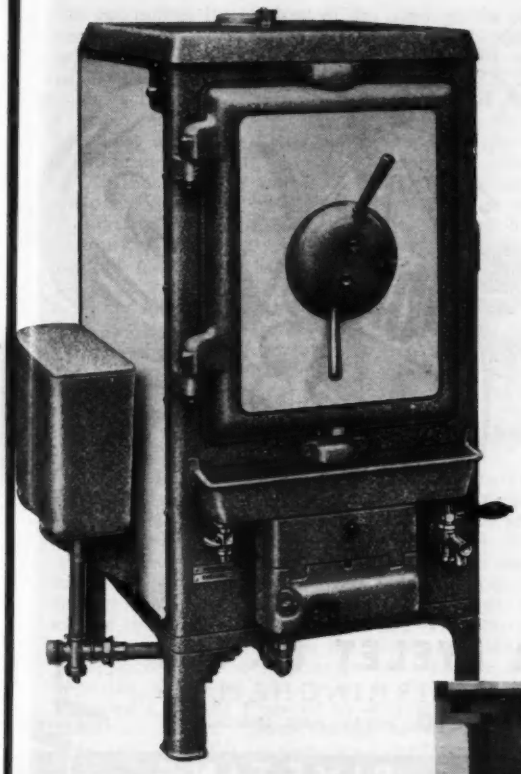
The team felt that in spite of limitations in supplies and other difficulties more might be done in this country to obtain more selective allocations of coal to the various carbonising units. Blending of coals, although expensive, would require to be considered in dealing with this matter.

The life of American ovens was generally longer than in Britain. They had been fortunate in that war conditions had interfered very little, if at all, with normal maintenance and operation, but there was also evidence of very considerable care they gave to their coal and to working to quite strict operational schedules.

One feature that particularly impressed the team was the condition of the silica work in ovens. It was clear that American technologists recognised that a high and consistent quality of silica was essential for oven construction and that great care was exercised by manufacturers to obtain the required high quality product. Two eminent engineers recently expressed the view that American silica was not superior to British silica. The team suggested, nevertheless, that some usefud information may be gained by a closer examination of some of the features of American silica.

There is very little carburetted water gas production in America and the team did not have the opportunity of examining any plants in operation. They were, however, interested in the American immediate post-war experience in C.W.G. plant operation, particularly in respect of gas output per unit of grate area, and in the use of heavy fuel oils. It was found that high outputs from American plants were primarily due to the use of very high blast pressures and it is undoubtedly true that in this country

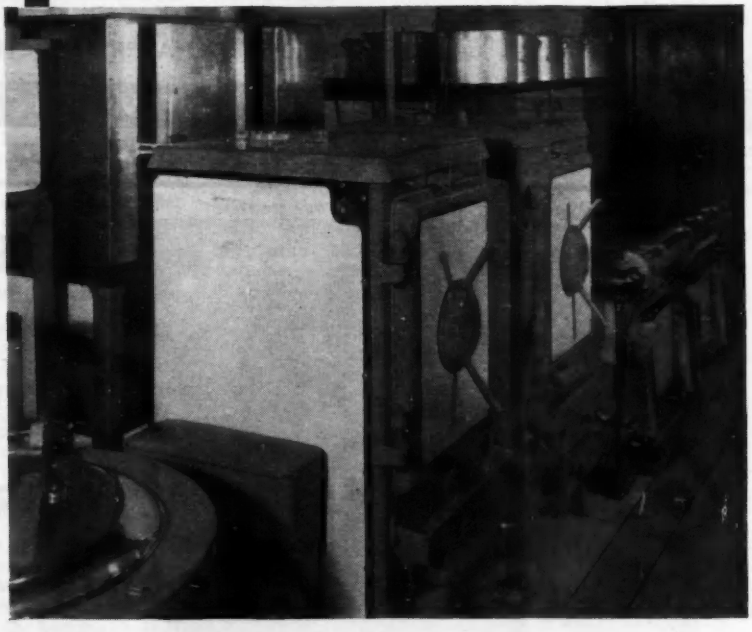
(*Continued on p.* 811)



KESWICK STEAMER

Wherever there is the need to cook food in bulk there is a place for the Keswick Gas Heated Steamer. This appliance will deal with 90-100 lbs potatoes in an hour, or 24-lb. fish in 25 minutes, or sufficient steamed pudding for 320 persons can be accommodated in the six baskets provided. The appliance is thermostatically controlled and is finished in Radar mottled vitreous enamel with white vitreous enamelled panels.

The illustration below shows two Keswick Steaming Ovens included in a large kitchen in London.



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the gas output from many of the older plants particularly could be increased by using higher blast pressures. A good deal of data is included in the Report on the use of heavy fuel oil for C.W.G. and high B.T.U. oil gas manufacture, and a greater knowledge of its use on C.W.G. plants in this country is desirable to enable us to adjust our operations to any change in the economic position in relation to gas oil and heavy fuel oils.

On the question of peak loads, the winter/summer ratio in America was very different from ours. In Britain the maximum ratio is about 2:1, but in America the ratio was as high as 10:1, largely due to the exploitation of natural gas for space heating. Endeavours were made to reduce the winter load/summer load ratio by creating substantial numbers of 'off peak' customers who took gas supplies in summer but not in winter, and 'interruptable' customers who reverted to alternative fuels in place of gas at very short notice.

Very few gasholders were being erected in America. It was stated that some 78% of the gas distributed did not pass through gasholders and one or two instances were observed where companies distributing natural gas possessed neither works nor holders. The Americans were relying increasingly on underground storage, and were also developing high pressure storage in special steel cylinders laid underground. A system of this nature stored gas at 2,400 lb. per square inch and had a capacity of 70 mill. cu.ft.

On the distribution side the Americans had developed, largely as a result of the increasing transmission of natural gas, the extensive use of steel mains for gas distribution, and had made studies of cathodic protection. They were now convinced that it was possible for steel mains to have a useful life of 60 years or more. They were also convinced of the value of periodic leakage surveys on the gas distribution systems.

DISTRIBUTION AND UTILISATION

Mr. L. F. Randall said that one thing that impressed the team was the extent to which the Americans had streamlined their gasfitting work. They saw a lot of 1¼ in. and ¼ in. pipe, but no ⅜ in., very little ½ in., and he wondered whether it was necessary for us to use the wide range of sizes which involved holding large stocks of fittings for every size. So far as appliances were concerned they were impressed with the American gas range which was built to sell on the assumption that it would be replaced after a reasonable life. In the States they regarded a 10 year old cooker in the same light as we regarded a cooker from 20 to 40 years old. The whole idea was that a cooker should be used for a limited time and with that in view the manufacturers introduced something new every six or 12 months, in order to encourage replacement sales. Most of the water heaters were of the bulk storage type directly heated by a drilled ring type bunsen burner. The popular model was of 30 gal. capacity, but the gas industry was encouraging the sale of 40 and 50 gal. models as they considered that water heaters of this size could best meet the demands of the average American family.

Instantaneous Heaters Not Popular

Members of the team asked about instantaneous water heaters and were told that this method of heating was not popular. Gas was cheap there and people used it liberally, but he would not wish them to gather from that that the manufacturers were not efficiency-conscious. They found that both in domestic and industrial equipment there were so many people making the same types of appliances that they were always trying to out do each other, and if one manufacturer could make an appliance more efficient that in itself justified a sales campaign.

Whole house heating represented a colossal load in America, and 40% of all the 8¾ mill. consumers used gas for that purpose. The average consumption per consumer using natural gas was 884 therms a year, and the major portion of that was taken during the heating season. In some instances the companies were selling gas as fast as they were allowed, for State legislation had laid it down that more gas must not be sold than could be adequately supplied by the pipelines under periods of extreme peak loads. Two popular appliances were the incinerator and a rotary clothes drier, the latter being a gas heated electrically operated rotary drum drying machine. American kitchens were big enough to work in, and in most private houses a large basement was constructed underneath the house to take the heating apparatus and afforded ample room for the washing machine and clothes drier. At the time of their visit the best seller in the States was the clothes drier, but he did not think any domestic appliance of this type had been produced in this country, but it would be interesting to see how it would sell here; he thought the great difficulty we should be up against would be lack of space.

Figures for commercial and industrial utilisation were interesting. In this country we sold to industry 23.9% of the total gas supplied; in America they sold 52.9%. In total they sold 40 times more therms to industry than we did here, and this was due partly to the fact that gas was cheap and highly competitive with oil, and it competed with pulverised fuel and lump coal.

There was a tendency for the American gas industry only to be concerned with selling gas to industry and commerce because it was so cheap, and to leave it to the manufacturers to undertake the selling of equipment. There was some uncertainty about this policy because the appliance manufacturers made appliances which consumed other forms of fuel and would naturally sell those appliances which gave them the best return. On sales generally, publicity of course was the great thing; they had only to read any American magazine to realise that. The A.G.A. had framed their publicity on one theme—the encouragement of dissatisfaction. The idea was to make the reader of the advertisement dissatisfied with the existing gas appliance and therefore desirous of buying a better one. It had been surprising to find that some gas companies were not responsible for more than 5% of actual sales of appliances; they were willing to leave the selling to the dealer or the ironmonger or the plumbing contractor, who had trained salesmen and showrooms for the display of apparatus. In some instances the decoration and layout of the showroom was actually provided and paid for by the local gas company.

Gas companies provided free servicing of gas appliances provided it meant only adjustments, tracing escapes, or the lighting up or shutting down of a heating plant, except in those cases where there were combined gas and electricity companies. As the electricity companies did not give free service the gas component of a gas-electricity company fell into line with electricity practice.

DISCUSSION

The **President** referred to the isolated consumer and enquired whether he was supplied with piped gas or bought bottled gas. The Americans appeared to make a great deal of their cathodic protection and it was suggested that it might offer a solution to the problem of protecting steel mains in this country. Very largely cathodic protection was very successfully applied in America to the long distance transmission lines where there were long lines fairly remote from other plant. The North Thames Gas Board had been experimenting in a small way with cathodic protection on its steel mains network, but whereas it had had success on isolated transmission lines on lengths of arterial road it had had no success so far as he could judge on networks. They had not been told whether the Americans had applied cathodic protection successfully to distribution networks in town as distinct from their long distance transmission lines.

Emphasis had been put on the fact that credit meters were universal in the States. One could appreciate that the capital cost was lower, but he had found, at any rate so far as North Thames was concerned, that the cost of collection per meter was higher in the case of credit meters than prepayment meters, and that might offset the advantage of lower capital cost.

Mr. E. W. B. Dunning (North Thames) wondered whether there was any limit to the supply of natural gas, and what were the Americans going to do when the supply ran out. It was all very interesting to hear about American gadgets, but the crucial question was—do they work?

Mr. A. A. Old enquired whether the position of the interruptable consumer was governed by a gentleman's agreement or some other means. The American approach to the subject of peak load seemed the opposite of our own.

Mr. A. Anderedge (Eastern) asked how, in the absence of prepayment meters, the Americans dealt with the bad payer. The British gas industry might consider the application of electrical control to some of its dearer gas cookers, as was done in America, but he wondered whether the gas companies' men were trained to deal with such cases.

Mr. C. H. Purkis (North Thames) sought information about the competitive position between gas and electricity in America. Was there fierce competition between the fuels, and was there any measure of national policy governing the use of gas and electricity for various purposes. Particularly in the case of the 'combination utilities' was there any guidance as to the choice of fuels?

Mr. D. R. Wills (North Thames) said it was not surprising that with gas at the equivalent of 2½d. or 3d. per therm there was enthusiasm for whole house heating in the States. At such prices there would be equal enthusiasm here, and there would be consumptions up to 1,200 therms per annum; it would be far cheaper than coal or solid fuel at the moment.

Mr. Hepworth, briefly replying to the discussion, said the American gas industry did not deal in bottled gas; that was quite a separate industry, and many outside interests other than the gas industry consumed large quantities of liquefied petroleum gases, the bottled gas business being one of them. Most members of the team had asked how long natural gas would last. Several years ago it was estimated that it would last 25 years. A recent geological survey showed that supplies were likely to last another 25 years despite considerably greater consumptions. This was due to the discovery of further reserves of natural gas. Research on gas manufacture and gas processes in America was very active indeed. They had some very fine research organisations, and one thing they were studying with great interest was the question of complete gasification of coal. They expected to have a commercial plant at work within the next 8-10 years.

The figure of about 2½d. per therm which he had given in his opening represented the cost of natural gas to the receiving gas companies and not the cost of gas to the consumer.

Mr. Randall, also replying, said the preference for credit meters was due firstly to the possibility of theft from the prepayment meter, and secondly to the fact that gas was cheap and the gas bill was in itself only a small item in the household budget. Most companies rendered monthly or two monthly accounts. So far as the bad payer was concerned there was usually a service cock fitted outside the house which proved a most useful asset when the gas company's bad debt collector called and obtained no reply. The incorporation of electrical devices on gas appliances had resulted in the one fitter attending to any defect either on the gas or electric side.

Answering Mr. Dunning, Mr. Randall said most of the gadgets did in fact work, and the American housewife appreciated their value. So far as interruptable supplies were concerned the consumer must as a condition of the contract put in a stand-by plant—oil, pulverised fuel, or liquid petroleum. In answer to Mr. Purkis there was no national policy on fuel; all consumers pleased themselves, but there was intense competition between gas and electricity.

On the proposition of **Mr. Hetherington,** a vote of thanks was accorded to Mr. Hepworth and Mr. Randall.

COMPANY NEWS

GIBBONS (DUDLEY) LTD.

In his statement issued with the report and accounts, Colonel W. E. Gibbons, Chairman of Gibbons (Dudley), Ltd., reports that the gross profit of the company and its subsidiaries for the year ended December 31, 1952, was £240,193. Of this amount £132,244 must be provided for taxation, leaving a net profit of £107,949, in addition to last year's carry-forward of £52,900. This represents another very good year's trading. He hopes that the partial restoration of the initial allowance in the Budget and the increasing general confidence in the country will result in a gradual improvement, but it is too early yet to say whether this is so or not. Stocks increased by nearly £100,000 during the last 12 months. To some slight extent, this has been due to more difficult selling, but in the main, the reason is that owing to the steel shortage, contracts have taken longer to finish and there happened to be at the end of the year in the works a large accumulation of material which could not be delivered. Employees received bonus and holiday with pay for the Coronation, and the board paid a second interim dividend of 2½%, described as a Coronation bonus, and recommends that the same final dividend of 10% as last year be paid.

MONTEVIDEO GAS & DRY DOCK

Mr. Frank H. Jones, Chairman, told the 81st annual meeting of the Montevideo Gas and Dry Dock Company in London on June 4 that there had been a net loss on the year's working. The all-in cost of coal—due in large part to freight rates—was so high that the tariff increase granted by the Uruguayan authorities with effect from April, 1952, proved inadequate to cover it. Freight rates had, however, fallen considerably from the exceptional level to which they were driven by the international tension and which had so adversely affected the company's trading. The company's record was otherwise an excellent one. Consumers in the last six years had increased by 55%—from 20,000 to 31,000—and demand for gas continued good. Mr. Jones said he had been associated with the company for over 40 years and chairman for 27 years. During the current year he intended to lay down the office of chairman. Mr. R. B. Robinson had agreed to join the board in the near future. The Robinson family had been connected with gas manufacture and tar distillation in the Midlands for the last 100 years.

WOODALL-DUCKHAM LTD.

Mr. T. C. Finlayson, Chairman of Woodall-Duckham, Ltd., in his statement issued with the fifth annual report, recalls that it is just 50 years since two young engineers, Harold Woodall and Arthur Duckham, invented a new method of coal carbonisation which became known all over the world as the Woodall-Duckham continuous vertical retort. It is around this invention that Woodall-Duckham, Ltd., and its operating subsidiary companies grew to their present size, and the directors are, therefore, regarding this year as marking the company's jubilee. Results for 1952 broke all previous records. The value of work carried out last year by the principal operating company of the group, together with its subsidiaries, attained a figure of £10,200,000. This showed an increase of approximately 20% in comparison with 1951. As orders received during 1952 exceeded the value of work executed the operating companies can look ahead for two or three years with considerable confidence. The directors are recommending that the capital be increased from £800,000 to £1 mill. by the creation of a further 800,000 ordinary shares of 5s. each and that £50,000 of the available reserves be capitalised and distributed in the form of 200,000 fully paid new ordinary shares among the ordinary shareholders in the proportion of one new ordinary share for every eight ordinary shares held on June 16.

Mr. G. J. F. Jackson, having attained the age of 70, retires from the board in accordance with the retirement policy of the group, whereby full-time working directors retire at 65 and part-time directors at 70. Mr. Jackson served for over 25 years as Managing Director of the principal operating company with which almost the whole of his working life was spent.

Functional Design of Gas and Coke Appliances—(*Concluded from p. 807*)

to fetch the more conveniently located coal, which she found burned even better on the coke grate than it did on the old coal fire.

While their publicity on domestic coke fires required revising, the industry would derive benefit from the adoption of a scheme whereby a suitable storage bin was offered free of charge, or at least on attractive terms, with every coke fire sold by the board, on the undertaking of the user to take a reasonable quantity of coke for, say, an initial period of perhaps two years. Only if this was done would the domestic housewife be influenced to use coke. Regular deliveries of properly graded coke were essential to the maintenance of the business.

The cost of maintaining coke grates also had an important bearing on sales, particularly with local authorities controlling housing estates, and possibly a scheme of free maintenance of coke grates supplied by the area boards to users of specified quantities of coke might have something to commend it.

THERE IS NO SATISFACTORY SUBSTITUTE FOR OUR MODERN

CHROME GRILL FRETS

available for all types of gas cookers.

THIS GRILL DEFLECTOR

- becomes evenly incandescent and reflects intense heat in 40/60 seconds.
- with the special cross strand steel structure eliminates hot spots, warping and cracking.
- has, after exhaustive tests, proved to have a longer life with a higher degree of efficiency than those made from other materials.
- has been adopted by over 200 Gas undertakings at home and overseas.

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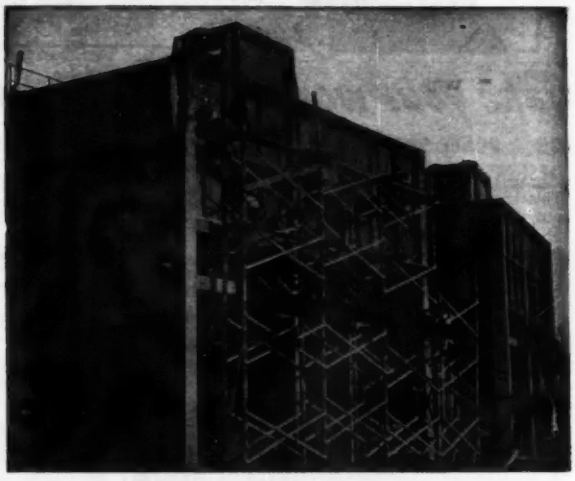

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This latest addition to the range of PRATT trailers embodies all the recognized qualities of the other models...sound design and construction, strength at minimum weight, excellent springing, stability, good carrying capacity.

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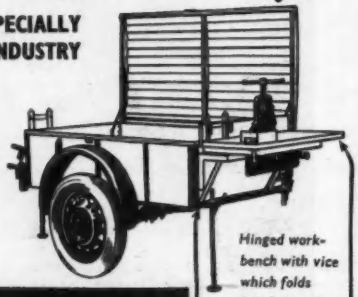

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Especially suited to the kitchens of flats and small houses, this highly efficient cooker provides utmost cooking capacity in the least possible space. Cast iron construction ensures strength and durability and reduces maintenance costs to a minimum, thus making the Dainty Minor particularly suitable for simple hire or hire purchase.

Approved and adopted by leading gas boards

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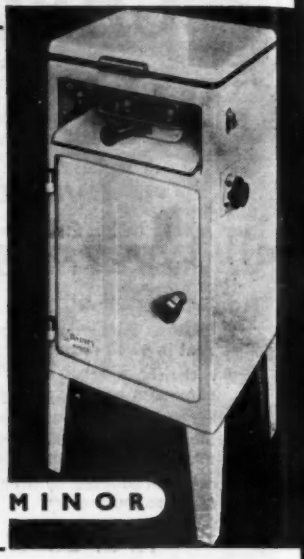

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The "Gas Journal" is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire :- 52/- per annum; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide; block screen 120.

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MIDLANDS OFFICE: 10, Union Street, Birmingham.

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In Every Ship of the Royal Navy

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is exempted from the provisions of the Notification of Vacancies Order, 1952.

WALES GAS BOARD

SALESMAN CANVASSER—
PEMBROKE AND CARMARTHEN GROUPS

APPLICATIONS are invited for the appointment of SALESMAN CANVASSER to the above Groups. The person appointed will be required to work within the area of the 13 undertakings forming the two Groups to which he may be directed from time to time.

Previous experience in the Gas Industry is desirable but not essential. The post is graded as Grade B, Provincial 'B' the salary scale for which is £365 to £445 per annum. The commencing salary will be commensurate with age and experience.

The successful candidate will be required to pass a medical examination and subscribe to the Board's Superannuation Scheme.

Applications, stating age, education, previous experience and any other relevant information, together with the names of two referees, should be sent to the undersigned on or before Thursday, June 25, 1953.

K. E. TIDDY,
Group Chairman and Convener.

Carmarthen Group,
Gas Works,
Carmarthen.

SOUTHERN GAS BOARD

NORTHERN DIVISION
TECHNICAL ASSISTANT—
AYLESBURY AND DISTRICT GAS UNDERTAKING

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT (DISTRIBUTION) on the Staff of the above Undertaking.

Applicants will be required to work under the direction of the Group Distribution Engineer and should be conversant with the design of high and low pressure mains systems and be able to supervise main-laying work.

The salary will be in accordance with Grade IV, Provincial 'B', of the National Salary Scales (£290-£480 per annum).

The post is pensionable and the successful applicant may be required to pass a medical examination.

Applications should reach the undersigned not later than June 22, 1953, giving the names of two referees.

E. B. CRADDOCK,
Engineer and General Manager.

87/89, High Street,
Aylesbury,
Bucks.
June 6, 1953.

SOUTHERN GAS BOARD

NORTHERN DIVISION
GROUP DISTRIBUTION ENGINEER—
AYLESBURY AND DISTRICT GAS UNDERTAKING

APPLICATIONS are invited for the position of GROUP DISTRIBUTION ENGINEER to the above Undertaking.

Applicants must have administrative experience and be capable of preparing estimates and specifications and supervising work on both high and low pressure mains systems.

The salary will be within the range of Grades VIII and IX, Provincial 'B' (£570-£700 per annum) of the National Salary Scales, according to experience.

The post is pensionable and the successful applicant may be required to pass a medical examination.

Applications should reach the undersigned not later than June 22, 1953, giving the names of two referees.

E. B. CRADDOCK,
Engineer & General Manager.

87/89, High Street,
Aylesbury,
Bucks.
June 6, 1953.

(Classified advertisements continued on Supplement 4)

APPOINTMENTS VACANT (ctd.)

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ASSISTANT DISTRIBUTION
SUPERINTENDENT—ST. ALBANS AND ADJACENT DISTRICTS
ASSISTANT DISTRIBUTION
SUPERINTENDENT—WATFORD AND ADJACENT DISTRICTS

APPLICATIONS are invited from suitably qualified persons for the above positions. Applicants should have had experience in all practical aspects of distribution including High and Low Pressure Main and Service Work and control of labour.

Commencing salary will be up to A.P.T. VII (Fringe Met.) with placing according to age and experience. Successful applicants will be required to pass a medical examination and participate in the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience to be addressed to the undersigned and received not later than June 30, 1953.

T. C. BATTERSBY,
Divisional General Manager.

Radiant House,
Clarendon Road,
Watford.

EAST MIDLANDS GAS BOARD

LEICESTER & NORTHANTS. DIVISION
LEICESTER UNDERTAKING

APPLICATIONS are invited for the following appointments at the Aylestone Road Works:—

SHIFT SUPERINTENDENT
Grade A.P.T. VIII (£585-£665 per annum)

Applicants should possess the Higher Grade Certificate of the I.G.E. or its equivalent. The appointment will complete a team of three Superintendents working a rota based on a 48-hour week.

TECHNICAL ASSISTANT
Grade A.P.T. IV-V (£305-£540 per annum)

Applicants should possess the I.G.E. Ordinary Grade Certificate or its equivalent.

The Aylestone Road Works has an output of 16 million cu. feet per day and both appointments provide good opportunities for men desirous of gaining overall experience on a large works.

A house is available, if required, at a nominal rental.

The successful candidates may be required to pass a medical examination, and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointments.

Applications stating age, qualifications, present position and experience, together with the names of two referees, should be addressed to the undersigned to be received not later than Wednesday July 1, 1953.

H. B. TAYLOR,
Divisional General Manager.

Millstone Lane,
Leicester,
June 13, 1953.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP
CARBONISING ASSISTANT—
STRETFORD WORKS

APPLICATIONS are invited for the above pensionable appointment at a salary within Grade A.P.T. VI (£490-£570 per annum).

The applicant must have had experience in the maintenance, operation and efficient working of all types of carbonising plant, and he will be expected to carry out his duties under the direction of the Carbonising Superintendent.

Detailed applications, giving the names of two referees should reach the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester, 2, within twelve days. Envelopes should be endorsed "Carbonising Assistant."

THE NORTH WESTERN GAS BOARD, Fylde Group, Blackpool, require two FIRST CLASS GAS FITTERS.

Applicants must hold the City & Guilds Full Technological Certificate in Gas Fitting. J.I.C. Schedule rates of pay.

Applications to be addressed to the Personnel Officer, Fylde Group, North Western Gas Board, Princess Street, Blackpool, and received within fourteen days from the appearance of this advertisement.

NORTH WESTERN GAS BOARD

LIVERPOOL GROUP

APPLICATIONS are invited for the pensionable position of INSTRUCTOR at the Liverpool Training Centre, at a salary within the range of Grades A.P.T. VIII-IX (£585 to £715 per annum). Applicants should have had recent Gas Fitting experience on the district and must possess the City and Guilds Final Certificate in Gas Fitting. Preference will be given to applicants who, in addition, possess a Certificate in Gas Engineering (Supply).

The person appointed will be required to devote his whole time to teaching the theory and practice of gas fitting including the construction, performance and maintenance of gas appliances.

Detailed applications, giving the names of two referees, should reach the Chief Personnel Officer, North Western Gas Board (Liverpool Group), Radiant House, Bold Street, Liverpool, 1, within fourteen days.

SCOTTISH GAS BOARD

GLASGOW DIVISION
(GLASGOW DISTRICT)
ELECTRICAL ENGINEERING ASSISTANT

A VACANCY EXISTS in the Engineering Section of the Glasgow District for an ELECTRICAL ENGINEERING ASSISTANT.

Applicants must possess the Higher National Certificate in appropriate Engineering subjects, or be corporate members of the Institute of Electrical or Civil Engineers. They must be able to prepare schemes and relative specifications, drawings, etc., embodying up-to-date electrical equipment, as applied to the Gas Industry, and be able to supervise Contracts and carry out all necessary maintenance tests on existing equipment.

The salary will be within Grades A.P.T. VIII-X (£585-£765) and placing within these Grades will be in accordance with qualifications and experience.

The post is superannuable and the successful candidate may be required to undergo medical examination.

Applications endorsed EA/EO, stating particulars of age, qualifications and experience, together with the names of two referees should reach the undersigned on or before Saturday, July 11, 1953.

D. F. YOUNG,
Divisional Controller.

30, John Street,
Glasgow, C.1.

NORTHERN GAS BOARD

SUNDERLAND DIVISION
HOME SERVICE ADVISER

APPLICATIONS are invited for the position of Home Service Adviser.

The successful candidate should hold a recognised Diploma in Domestic Science, and apart from other duties, will be responsible for organising and conducting cookery demonstrations throughout the Sunderland Division.

Previous experience in a similar capacity within the Gas Industry, while not essential will be deemed an advantage.

The salary will be within A.P.T. Grade 5 (£368 to £432 per annum) according to qualifications and experience. Conditions in accordance with the Agreement of the National Joint Council for Gas Staffs.

Applications endorsed "Home Service Adviser" stating age, experience and qualifications giving names of two referees, should be addressed to the undersigned before June 30, 1953.

W. O. KIRKWOOD,
Divisional General Manager.

Fawcett Street,
Sunderland.
June 15, 1953.

PLANT FOR SALE

FOR SALE:—Elbows— ½in. Gas, parallel thread malleable. Large quantities, 2d. each. Apply The Purchasing Department, The Parkinson Stove Co. Ltd., Stechford, Birmingham, 9.

EDUCATIONAL

THE GAS COUNCIL

RESEARCH SCHOLARSHIPS

THE GAS COUNCIL invites applications from students who have recently graduated in physics chemistry or engineering, for five Research Scholarships which it proposes to establish. The scholarships will be awarded for a period of three years from September 1953, and will be tenable at the Universities of Oxford Cambridge, London, Birmingham and Glasgow. The subject proposed for research must afford scope for original work and be of a fundamental character approved by the Research Committee of the Gas Council which is interested in problems related to the manufacture distribution or use of gas. Each scholarship will carry an allowance at the rate of £350 a year together with the payment of University and College fees.

Particulars and application forms, which should be submitted on or before June 30, 1953, may be obtained from the Secretary, the Gas Council, 1, Grosvenor Place, London, S.W.1.

MISCELLANEOUS

FACTS ON THE PLATE

THESE DAYS, a sound investment is something to write home about. What we write of here is not a new discovery, for it has long been at the disposal of industry. The point is that only the alert are using it to their full advantage. We refer to the help afforded to administration by a FULL PHOTOGRAPHIC RECORD of constructional jobs from foundation to completed building, from rough casting to finished product. Nothing escapes the eye of the camera. No other recorder covers such a wide field. A progressive file of photographs taken at regular, specified intervals, is an ever-present aid to the busy executive. It can be referred to at once in case of any point which may arise during the construction of plant or the making of a product. It shows progress at a glance unmistakably and eliminates the cause of wrangling and argument.

Walter King Photographs are specially staffed and equipped for this type of work and are prepared to tour the Midlands, Southern Counties, and Home Counties.

Details of this photographic service on request to Walter King, Ltd., 11, Bolt Court, Fleet Street, London E.C.4.

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THE COOKER CLEANER
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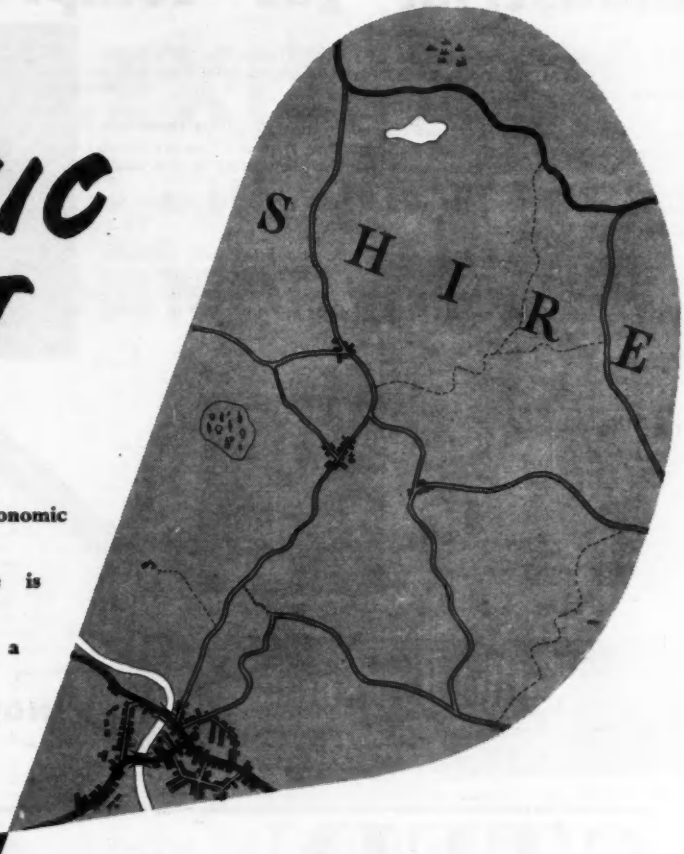
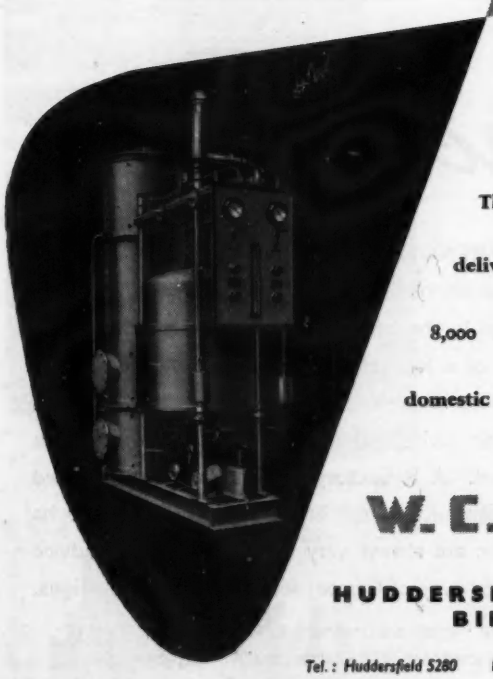
THE ECONOMIC UNIT



The conception of the minimum economic unit of gas manufacture is wider when the source of supply is a Holmes-Mallet Butane air plant.



THE ECONOMIC UNIT

The Holmes-Mallet Butane Air Plant illustrated delivers a butane air mixture up to 8,000 cubic feet per hour which can be used for all domestic and industrial purposes.

W. C. HOLMES & CO. LTD.

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FOUNDED 1850 HOLMES HUDDERSFIELD

C1811

industrial gas compressors

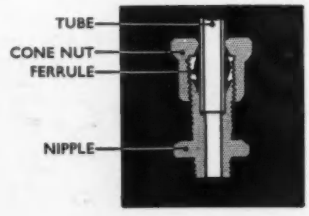
FOR COMPRESSING AIR OR GAS SUPPLIES USED FOR FURNACE HEATING, METAL MELTING, BRAZING, SOLDERING BITS, LAUNDRY IRONS, ETC.

DIRECT COUPLED COMPRESSORS (see illustration right) are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" x 7½".
CAPACITY RANGE: 100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.

TYPE 4 COMPRESSORS (not illustrated) are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.
CAPACITY RANGE: 500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.
AREA OCCUPIED: from 9¼" x 16½" to 61" x 27".

DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. *Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.*



serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies. **Size Range:** 1", 1¼", 1½", 2" and 2½" outlets. **Capacity Range:** 45-280 cub. ft. of gas per hour.

Brass non-blow-off head types: deal with 5 to 10 cub. ft. of gas per hour.

Stainless steel, "F" type head, burner: deals with 8 cub. ft. of gas per hour.

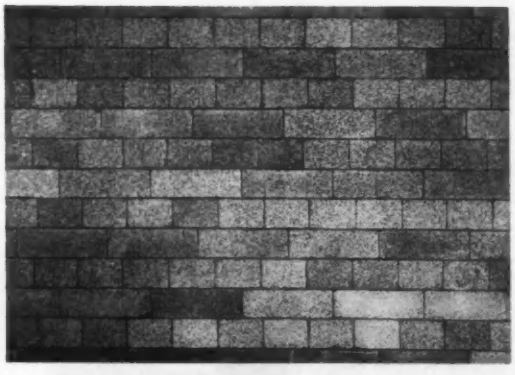
Perforated head type burner: deals with 10 to 15 cub. ft. of gas per hour.

Keith Blackman LIMITED
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17
'Phone: Tottenham 4322 (twelve lines) 'Grams: "Keithblac, Norphone, London."
BRANCH OFFICES AT MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW, NEWCASTLE-ON-TYNE, PENARTH near CARDIFF, AND BELFAST

INDUSTRIAL GAS EQUIPMENT

524

STEIN *Refractories*



THE STRENGTH OF FURNACE BRICKWORK—and durability of the furnace lining in service is greatly controlled by the joints. Well shaped bricks of accurate size, use of a Refractory Cement correctly chosen for the purpose, combined with good bricklaying (which means thin, tight joints) gets a furnace lining off to a good start. A Refractory Cement should be selected just as carefully as the brick with which it is to be used. We are always very willing to give our advice on the best type of Cement for particular applications.

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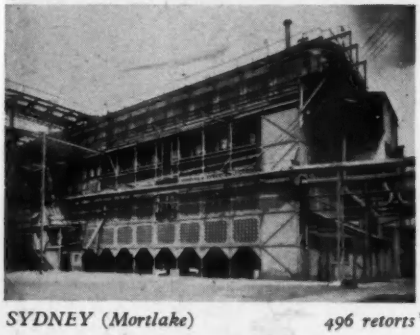

SYDNEY (Mortlake) *496 retorts*

SOUTH BRISBANE *56 retorts*

WELLINGTON *96 retorts*

JOHANNESBURG *78 retorts*

TORONTO *104 retorts*

FLEXIBILITY IN THE COMMONWEALTH

Flexibility of control enables Glover-West continuous vertical carbonization plant to deal efficiently with any gas-making coal. This fact—and the resultant fuel economy—recommends the system to expanding gas industries in the Commonwealth and elsewhere. Backed by progressive research producing such developments as "Balanced Heating", the "Hot Gas" Mechanical Producer and the Sector Discharger, it keeps the name of Glover-West in the forefront of gas-making practice. In carbonization, at home and overseas, flexibility counts.

West's Gas IMPROVEMENT CO. LTD.

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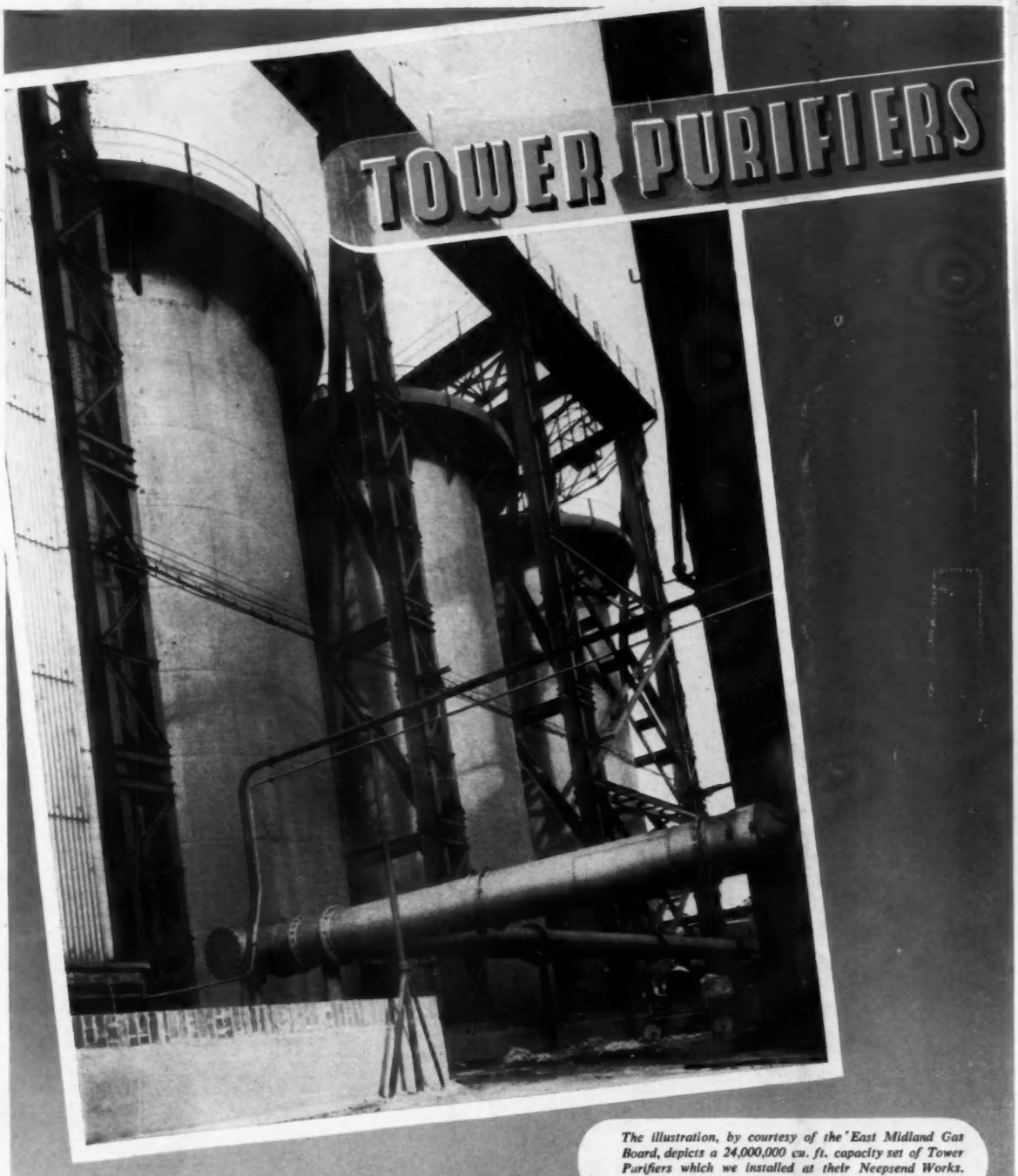
GW 2a



The illustration, by courtesy of the East Midland Gas Board, depicts a 24,000,000 cu. ft. capacity set of Tower Purifiers which we installed at their Neepsend Works.

NEWTON CHAMBERS

& CO. LTD. THORNCLIFFE, Nr. SHEFFIELD